

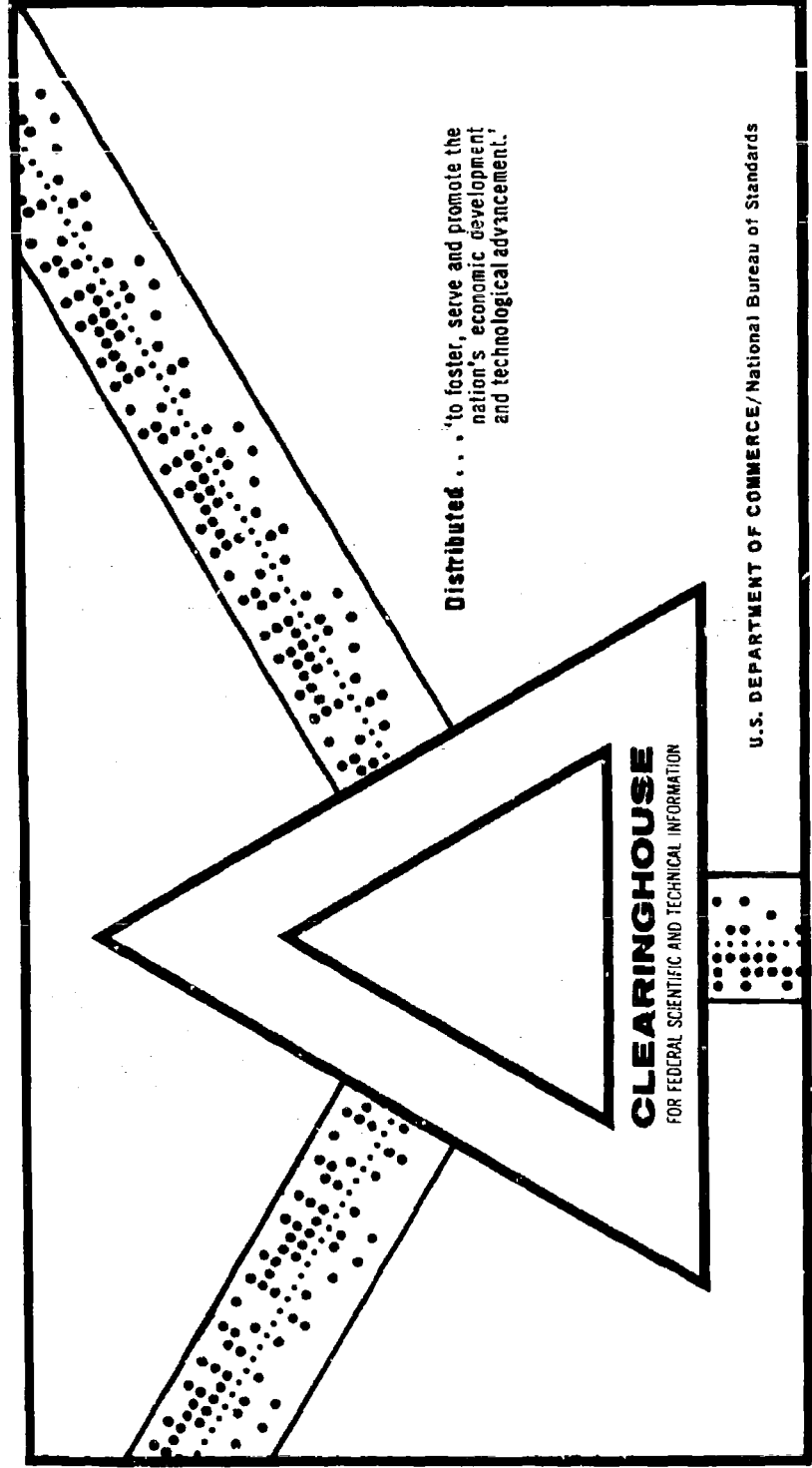
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AIR TRAFFIC CONTROLLER CAREER COMMITTEE REPORT

John J. Corson

Department of Transportation
Washington, D. C.

January 1970



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OFFICE OF THE SECRETARY OF TRANSPORTATION
WASHINGTON, D.C. 20590

January 29, 1970

The Honorable John A. Volpe
Secretary
Department of Transportation
Washington, D.C. 20590

Dear Mr. Secretary:

I transmit herewith the final report of the Air Traffic Controller Career Committee.

This report presents recommendations as to what needs be done with respect to (a) manning the air traffic system, (b) improving working conditions, (c) bettering the controller's career, and (d) improving employee-management relations. The recommendations are neither novel nor unexpected. They flow directly from the facts we have assembled and the analyses we present.

The need now is for action. The Committee's study, as you know, has received widespread attention among controllers and aviation organizations. A high level of expectation has been developed that the results of this study will be made generally available and that improvements will be effected. Hence, we recommend that you ensure the early and wide distribution of this report.

Some recommendations that are presented, if they are accepted, can be implemented immediately. There is an especial need for expeditious consideration of those recommendations designed to resolve the employee-management relations problems which threaten the system. Time will be required to implement other recommendations, or to obtain legislation to permit the implementation of still others. We suggest that, to ensure the action that is needed, you fix promptly responsibility within FAA for evaluating the recommendations that are presented, and that you fix in the Department responsibility for a continuing review of the action taken. If, as individuals, members of this Committee can assist you in the future by appraising the progress made, we will gladly do so.

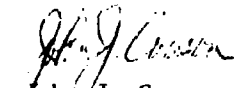
We have enjoyed this opportunity to serve you and your Department. Our carrying out of the tasks assigned us has been materially facilitated by the generous cooperation of your colleagues -

For primary distribution in
Distribution is recommended

The Honorable John A. Volpe
January 29, 1973
Page two.

Under Secretary James M. Beggs, Assistant Secretary Alan L. Dean, FAA Administrator John H. Shaffer and others. In addition, we have been assisted in large measure by the able staff that you made available to us through contract with Fry Consultants Incorporated and through the loan of departmental staff members. We are especially indebted to Bertrand M. Harding, for his able direction of the staff, and to Ellen Wormser of Fry Consultants and to Edward Curran and Edmund Longen of the Department of Transportation for their assistance in coordinating the staff's efforts.

Respectfully submitted for the Committee,


John J. Corson
Chairman

Members of the Air Traffic
Controller Career Committee:

Mr. Peter W. Bernhard
Dr. Allen D. Catterson
Dr. Robben W. Fleming
Mr. Arthur D. Lewis
Mr. James M. Mitchell
Mr. Stanley H. Ruttenberg

Encl.

JJC:jh

THE CAREER
OF THE
AIR TRAFFIC CONTROLLER -
A COURSE OF ACTION

EXECUTIVE SUMMARY
OF THE REPORT OF THE
AIR TRAFFIC CONTROLLER CAREER COMMITTEE

January, 1970

INTRODUCTION

Background

The air traffic controller career problems that gave rise to the establishment of this Committee have existed since the early Sixties. During the years since then, these problems have been aggravated by the rapid growth in air traffic, delay in the resumption of controller recruitment following its virtual discontinuance between 1963 and 1967, and by the lack of positive efforts to diagnose the personnel needs of the system and to meet them. By mid-1963, these factors had caused acute unrest among the controller work force, unprecedented strife between organized controllers and FAA's management and in two or more instances, the threatened breakdown of a service that is essential to the safe and efficient operation of this Nation's air transport system.

The Committee's Mandate

Department of Transportation Secretary Volpe appointed, on August 8, 1969, an Air Traffic Controller Career Committee "to inquire into various aspects of the air traffic controller career". The Secretary requested that the inquiry "cover, but not be limited to, employee compensation, work environment, employment practices, training, employee/management relations, organization and direction."

The Committee, composed of citizens with a combination of relevant experiences - in aviation, aviation medicine, air traffic control, labor relations, and public administration, endeavored to fulfill this mandate in the following ways:

- Face-to-face discussions with approximately 400 controllers and 100 supervisors at about 30 facilities.
- Study of written views of, and extended discussions with, officials of employee and aviation-related organizations as to problems affecting air traffic personnel and of various recommendations as to what actions should be taken.
- Consultation with representatives of the Civil Service Commission, the Bureau of the Budget, and the National Aeronautics and Space Administration.
- Extensive staff research to provide objective data for Committee consideration.

A succession of Committee meetings was held to consider the views and analyses derived from these many sources in order to formulate the findings and recommendations presented in this report. The Committee believes that there is a clear need for prompt action.

The Context within which the Controller Functions

The air traffic controller is an essential and central element in a complex system composed of planes, pilots, air space, airports, facilities and equipment, the Federal Aviation Administration, etc., on which the safe and efficient operation of air transport in the United States rests now and for the immediate future.

Our review indicates that this system has experienced serious shortcomings - particularly during the decade of the Sixties. Recent substantial budget increases and additional financial resources to be made available under the Airport and Airways Development Act hold promise for the future; however, it is our view that the improvement will not materially change the existing system for a number of years. In the meantime, the controller will continue to bear a heavy burden in making an understaffed and underfinanced system work.

The Controller's Talents and Role

The Committee is impressed with the fact that air traffic controllers constitute a unique professional group within the Federal

establishment. While many other categories of employees must possess some of the talents, and while many other jobs impose some of the exacting responsibilities, few combine as many demands upon the individual as does the job of the controller.

The successful controller appears to require - at least - the following special talents and aptitudes:

- A highly developed capacity for spatial perception.
- A keenly developed, quick and retentive memory.
- A capacity for articulate and decisive voice communication.
- A capacity for rapid decision making, combined with mature judgment.

There is compelling evidence that many controllers work for varying periods of time under great stress. They are confronted with the necessity of making successive life and death decisions within very short time frames - decisions requiring constant standards of perfection.

The operations schedule in most facilities requires that the personnel work on a 24-hour, multi-shift basis 365 days a year. This schedule adds to the day-in-day-out wear and tear on the individual and to the disruption of normal family and social relationships. The controller is convinced that the job is unique in that he will "burn out" between ages 40-50 and will not be able to continue controlling traffic.

MANNING THE AIR TRAFFIC SYSTEM (see pages 12-23)

The Air Traffic Service has been inadequately staffed for at least three years. Recent recruitment has tended to alleviate this dangerous over-all shortage of personnel, but serious deficiencies still exist in important facilities. No significant improvement in the demands made upon the controller will be made until these deficiencies in staffing are corrected. The controller authorization for 1970, plus the 1971 request, will obviously improve existing conditions, but -

- There is general agreement that the methods currently being used for determining personnel needs are inadequate.
- Manpower utilization policies and practices vary greatly among facilities for no evident reasons. This further confuses the issue of the adequacy of staffing.
- Extreme staffing shortages, especially in relation to current authorization of journeymen controllers, exist in several facilities (centers in particular) that serve very substantial volumes of air traffic.
- The shortage of staff is aggravated by the presence in busy facilities of a plethora of untrained developmentals whose training adds substantially to the work load of the journeymen.
- The extremely high attrition rate among those recently recruited (as high as 22% in the center option) further aggravates the staffing shortage.
- The current rate of recruitment offers no assurance that the agency will meet its 1970 hiring goal.
- Recruitment, hiring and assignment processes are designed to meet the needs of individual facilities and regions and are not related to the over-all staffing needs of the system.

Recommendations

The immediate actions required to alleviate the serious understaffing of facilities and to provide assurance that the air traffic control system can meet its responsibilities are:

1. Detail fully qualified controllers immediately to those high density facilities in which serious staffing shortages exist.
2. Substantially improve the system by which applicants are attracted to and recruited for the Air Traffic Service in order to increase the number and improve the quality of those hired.
3. Develop as promptly as possible revised methods for determining the staff needed which:

- Are based on more equal distribution of workload, Recognize the environmental and operating characteristics of individual facilities, and
 - Provide adequately for the reduction of presently required overtime, and for training, leave and other non-operational requirements.
4. Develop immediately and initiate as promptly as possible an accelerated qualification training program for individuals now serving as developmental controllers in facilities.
 5. Develop in fact, as well as in theory, a tradition of geographical mobility among controllers to the end that the needs of the system, rather than the personal preferences of the individual, control assignments.
 6. Require that control experience in high density facilities be a pre-requisite for appointment to higher level staff and supervisory positions in the ATS.

THE CONTROLLER'S CAREER

Perceptions of the Controller

Based upon the Committee's extensive discussions with controllers, their supervisors, and the employee organizations which represent them, we conclude that the FAA is confronted with a highly disaffected work force. The major items of complaint are:

- Working conditions are unsatisfactory and place an excessive burden on the controller - ranging from poor equipment to inadequate relief from particularly stressful position assignments.
- Not enough staff, and particularly fully trained staff, to meet the demands of the system.
- Too stringent policies on approval of Familiarization (FAM) trips.

- Too much differential in compensation between high and low density facilities (according to controllers at low density facilities).
- Not enough differential in compensation between high and low density facilities (according to controllers at high density facilities).
- Inadequate training - both at entry and in order to maintain proficiency. Controllers also complain of the lack of good supervisory training programs.
- Inadequate provision for reassignment, retraining, or early retirement for controllers who "burn out" - typically between 40 and 50 years of age.

The above views of controllers and their organizational representatives were also discussed, on several occasions, with representatives of FAA management.

Working Conditions (see pages 26-38).

The Committee found much justification for the numerous criticisms of working conditions. The major problems are that:

- The secluded nature of many of the facilities limit direct contact with the "real world" of aviation, resulting in controller dissatisfaction;
- The physical environment in most of the older terminals and flight service stations leaves much to be desired;
- Control equipment is inadequate both in terms of quality and quantity, and
- Management policies affecting working conditions are in need of examination and reappraisal.

The Committee recommends that the FAA:

1. Reduce the time that controllers are required to spend on operational positions - particularly those involving heavy traffic. This reduction should be accomplished by limiting consecutive hours on positions and total hours per day in operational duties, more liberal annual leave policies and

greater use of FAM trips.

2. Undertake with controllers and their employee organizations negotiations designed to lengthen the interval between shift rotations. Simultaneously, undertake an intensive, system-wide study of the physiological effects of alternative shift rotation practices.
3. Re-evaluate the nature and quality of annual medical examinations of controllers.
4. Improve the quality and quantity of existing facilities and equipment.
5. Undertake a thorough study of the man-machine relationships involved in the controller's exercise of his duties.

Selection (see pages 38-50)

The selection process is fundamental to the development of a viable controller organization. Both the individual and the agency have a great stake in the efficiency of this portion of the personnel process. Many inadequacies were found in the existing system, including:

- Failure to attract an adequate number of applicants and to inform adequately those who are attracted about their potential career.
- Failure to differentiate between those candidates best suited for service in either centers, terminals, or stations.
- Granting of undue weight to prior experience which is of doubtful relevance.
- The inadequacy of present instruments used - i.e., written tests, interview, etc.
- The lack of reliable objective measures of the proficiency of a controller, thus inhibiting the evaluation and improvement of its selection processes.

The Committee recommends the following:

1. Improve the hiring bulletin to the end that it more adequately describes the occupation.

2. Inaugurate a "pre-hiring" orientation program for applicants in order to further test the individual's capacity for and interest in the occupation.
3. Initiate an intensive analysis of the differential talents required for the three controller options in order to refine selection criteria for each.
4. Reconstruct the written test to include tests of other required skills and examine the present rules governing the types of experience deemed qualifying for employment.
5. Either through the examination process, or by special legislation, eliminate the large number of present hires above age 30.
6. Reduce the "wash-out" rate at the FAA Academy through additional coaching and observation.
7. Improve the interview process by better selection and training of interviewers and development of more standardized guidelines for the interview process.
8. Re-appraise all selection processes to assure that they seek out, and do not discriminate against, minority groups.
9. Develop more systematic and objective means for the evaluation of the proficiency of the controller on the job.
10. Detail fully qualified controllers immediately to those high density facilities in which serious staffing shortages exist.

Controller Training (see pages 50-64)

As in the case of controller selection, both the individual and FAA have a substantial stake in the processes by which FAA develops controller capabilities. The Committee examined the FAA controller training activities at the FAA Academy and at facilities and found:

- There are currently about 5,000 recently recruited controllers in the training - or developmental - pipeline. It is anticipated that another 4,000 might be added during the current fiscal year.
- The FAA Academy is greatly over-crowded as a consequence of recent recruitment efforts. An evening - night shift is anticipated.

- On-the-job training at facilities is characterized by non-standardized course material and proficiency requirements and by instructional staffs which too often appear to have minimal training for their role; radar training at the centers is not sufficiently standardized or undertaken at an early enough point in the process.
- Training programs directed at maintaining journeyman proficiency and developing supervisory and management capabilities are virtually non-existent.

The Committee recommends that FAA:

1. Revise the basic training schedule and curriculum for both centers and terminals to the end that the training period is shortened and made more relevant to the occupational requirements.
2. Establish a new and more rigorous proficiency training program for journeymen controllers.
3. Revise and emphasize supervisory and management training programs for present and potential supervisory personnel.
4. Provide greater capacity for training through simulation devices.
5. Develop the teaching qualifications of the FAA training staffs.

Compensating Controllers (see pages 64-78)

The pay system under which controllers are compensated is obviously an important element in any total picture of the career. The Committee found that although the pay structure is generally in line with comparable occupations within the Federal structure, many inequities exist as between individuals within facilities and as between facilities, and that there is unwarranted "compression" of salaries at the supervisory level in many facilities.

The Committee recommends that FAA:

1. Provide a monetary attraction for employment in certain high density/ high cost-of-living facilities by special pay rates. Authority for this arrangement probably exists in current Civil Service law.

2. Revise - and make more realistic - the criteria under which facilities are rated and individuals are graded.
3. Seek legislation that will provide FAA with more "supergrades" or will allow authority to place all upper management FAA positions in an "excepted" status and thereby create higher salary levels for high density facility chiefs, reducing grade compression at these locations.

Career Progression (see pages 78-85)

The opportunity to progress - occupationally and financially - is a key requisite for the members of a satisfied and productive work force. It is also a vitally important consideration, if management is to maintain a constant source of qualified candidates for its most important and demanding positions. The Committee found that:

- The essential characteristic of the present system is that the employee is recruited for - and remains within - a particular facility.
- This tendency toward a largely immobile work force is particularly harmful to the higher density/high cost-of-living facilities. In fact, there are a number of disincentives for transfer to these less desirable locations.
- There appears to be no national program designed to identify and develop a supervisory managerial infrastructure.

The Committee recommends that the FAA:

1. Formulate a career development plan that will provide a systematic national program for progressively responsible assignments of controllers. Such a system should culminate, for the most talented controllers, in assignment to the most difficult positions.
2. Develop various incentives which will attract the most talented controllers to the most difficult assignments and provide means to relieve him of these arduous duties after a reasonable period of time.

3. Establish an "ATS Managerial Training Corps" designed to provide a carefully selected and trained cadre of managerial talent.

Alternative Employment or Retirement (see pages 86-94)

A major cause of dissatisfaction among controllers is the widely held belief that they are confronted with the prospect of an early "burn out", after which they will be unable to continue in their chosen profession and will have few, if any, alternative means of maintaining their economic status. The Committee found little fully documented evidence to support or deny the early "burn out" theory, but there is supporting evidence that indicates that the profession is "stressful" and that controllers do, in fact, incur disability at an earlier age than the non-controller employees of FAA. The Committee recommends that the FAA:

1. Provide exacting annual proficiency examinations for all controllers and promptly remove those unable to meet acceptable standards.
2. Provide a counseling and training program designed to place in alternative positions, those controllers who can no longer safely and effectively control air traffic.
3. Make necessary arrangements for selected controllers to take courses from the United States Armed Forces Institute, of the Department of Defense.
4. Seek legislation to provide an "early retirement" provision for those controllers who have experienced high density duty and who cannot be retrained or reassigned to less arduous tasks.

Employee/Management Relations (see pages 98-111)

The Committee found that employee/management relations within FAA are in a state of extensive disarray, due to ineffective internal communications, to failure on the part of FAA management to understand and accept the role of employee organizations, and to ill-considered and intemperate attacks on FAA

management by certain employee unions. The Committee recommends that the FAA:

1. Re-evaluate and revise existing communication policies, and procedures in order to build a more effective interchange between FAA management and employees.
2. Take full advantage of the opportunity afforded by the new Executive Order (11491) on labor/management relations to revise its practices on dealing with labor unions.
3. Reconsider its position regarding the appropriate bargaining unit(s) for controllers.
4. Centralize authority for dealing with employee organizations on national issues, while decentralizing responsibility for handling local problems.

Needed Information and Research (see pages 94-97)

The Committee found that there is insufficient research and analysis relevant to all aspects of the controllers' career, and recommends additional emphasis on and coordination of this vital aspect of FAA's management responsibility.

REPORT OF THE
AIR TRAFFIC CONTROLLER
CAREER COMMITTEE

January, 1970

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REPORT OF THE
AIR TRAFFIC CONTROLLER CAREER COMMITTEE

INTRODUCTION

Background of the Problems

To most of the American public the crisis in the control of traffic over this nation's airways emerged upon the scene in the summer of 1968. It was at this point that substantial traffic jams, especially at the major air terminals, resulted in inordinate delays, flight cancellations and general disruption in air travel throughout this country. For the first time, many Americans heard of the Air Traffic Service and of air traffic controllers.

The 1968 crisis was rooted in the rapid growth of air traffic over the preceding years and the failure to expand airport facilities and air traffic control staff at a like pace. The immediate precipitator of this crisis was a program called "Operation Air Safety" launched by the Professional Air Traffic Controllers' Organization (PATCO). This organization instructed its members to adhere strictly to the letter of all regulations of the Federal Aviation Administration (FAA) governing the separation and control of aircraft rather than exercise their judgment, based on long experience, as to appropriate standards for prevailing conditions. This action clearly demonstrated to the FAA and to the public in general that a large proportion of air traffic controllers were unhappy with the manner in which the system as a whole was operating and that they were organized to make their views known in dramatic fashion.

A key cause of the controllers' unrest was what appeared to be a shortage of qualified controllers to man the critical control positions in airport terminals and in en route centers throughout the country. Controllers in these facilities were required to work long

periods without a break, work overtime and forego vacations. In spite of action in December, 1968, which resulted in a substantial pay increase for most controllers, employee unrest was general.

The understaffing of these terminals and centers had been a prime cause of discontent among controllers since about 1965. This situation had its roots in a decision made in FY 1962. At that time, the number of controllers exceeded the then current need, due in part to the reduction in the number of en route centers from 30 to 21. As a result, hiring was essentially discontinued between FY 1963 and 1967. The supply of controllers being trained in 1963 met the needs of the system for a period of time, but the need for the resumption of recruitment, it is clear in retrospect, was unfortunately not recognized until late in FY 1967, at which time recruiting was resumed.

The crisis which had been dramatized in 1968 again claimed national attention in June, 1969. On June 18, 19 and 20, approximately 500 controllers reported that they were ill and would not report for work. Air traffic came near an absolute halt in a number of this country's most used airports. It is estimated that over 300 flights were cancelled by five major airlines.

FAA, contending that the "sick-out" was a deliberate and coordinated act on the part of PATCO, cancelled its agreement to withhold dues for this employee organization and undertook an extensive investigation of the individual cases. FAA concluded that a substantial proportion of these controllers had absented themselves without proper cause and it initiated disciplinary action varying from oral admonishment to suspension up to 30 days.

The Committee's Mandate

On August 8, 1969, Department of Transportation Secretary Volpe appointed an Air Traffic Controller Career Committee "to inquire into various aspects of the air traffic controller career".* The Secretary

* Department of Transportation Order 1100.35, August 8, 1969.

requested that the inquiry "cover, but not be limited to, employee compensation, work environment, employment practices, training, employee-management relations, organization and direction".

The Committee is composed of citizens with a combination of relevant experiences - in aviation, aviation medicine, air traffic control, civil service administration, labor relations and public administration. (Appendix I contains brief biographical information on Committee members).

The Committee was provided with a staff of 16, composed of employees assigned by the DOT, loaned by the Internal Revenue Service and the Civil Service Commission, or contracted for by the Department. (See Appendix II). The Committee's work was continually facilitated by the efforts of Under Secretary James M. Beggs, Assistant Secretary Alan L. Dean and FAA Administrator John H. Shaffer to ensure that the Committee and its staff had full access to all materials, records and facilities that were needed.

At its initial meeting on September 3, the Committee was provided a full and comprehensive briefing by officials of the Department and FAA. Between September 4 and October 22, it conducted a series of facility visits, designed to enable it:

1. to gain an understanding of the air traffic control task and the environment in which it is performed,
2. to learn at first hand how controllers and their supervisors perceive the problems that had given rise to the crisis in the control of air traffic, and
3. to receive suggestions from the controllers and their supervisors as to how to make the job more viable and more attractive.

A representative group of terminals, en route centers and flight service stations were selected for these visits. Although concentrating on the higher density facilities (e.g. Chicago, New York and Los Angeles), the Committee did include a number of less active

facilities (e.g. Columbia, S. C.; Oklahoma City; Roswell, N.M.) on its itinerary.

Prior to each visit, the Committee requested the facility chief to schedule a meeting with a representative group of working controllers - journeymen and below. These meetings typically lasted about two hours, during which the controllers were encouraged to air all of their career problems and to propose solutions thereto. These discussions were conducted on a strictly non-attribution basis; no supervisory personnel were present.

Similar conferences were held at each location with a cross-section of supervisory personnel, i.e., crew chiefs, watch supervisors and others. Finally, Committee members and the staff director reviewed with the facility chief the problems and views advanced in the course of earlier discussions.

In all, the Committee met with approximately 400 controllers and 100 supervisors and administrative officials at 16 terminals, 7 centers, 4 flight service stations, FAA's research and development installation in Atlantic City (NAFEC), the training academy at the Aeronautical Center in Oklahoma City and an area office. (Appendix III contains a list of facilities visited.) The Chairman, members of the Committee and its staff director met with the FAA regional directors, the Federal Air Surgeon and regional Flight Surgeons and executives of the FAA and of the Department of Transportation on a succession of occasions.

In addition to these visits the Committee invited the individuals with whom it met, and [separately] each of the principal organizations of FAA employees, to submit in writing their views on problems affecting air traffic personnel as well as their recommendations as to what corrective actions should be taken. These requests, and others made to the Airline Owners' and Pilots' Association, the Air Transport Association, the Flight Safety Foundation and other organizations, were generously met.

The Committee received approximately 200 letters from individual employees and their wives, and submissions from eight organizations. From these written statements, it derived many valuable suggestions. Subsequently, extended discussions were held with the officials of the employee organizations and representatives of other groups to clarify and expand upon viewpoints they had presented in writing.

Finally, the Chairman and Staff Director consulted on several occasions with representatives of the Civil Service Commission, the Bureau of the Budget, and the National Aeronautics and Space Administration.

Mid-way through the Committee's field visitation schedule, the staff began detailed research into the major problem areas which were revealed by these visits. Detailed reports as to the substance of the Committee's discussions in each field facility and the written reports supplied by employee and other organizations were made available to the staff. In addition the staff studied a substantial number of relevant previous studies and background data on air traffic control and on various aspects of the controller's career. Staff members also made a limited number of field visits during the period of their study.

The Chairman and Staff Director have from time to time advised the Secretary and Under Secretary of the Department of Transportation and officials of the FAA of the Committee's course of action. Subsequently, when tentative findings had been agreed upon, they were discussed with a group of working controllers and employee organization representatives, and in turn, with relevant officials of the Department of Transportation, the FAA, the Bureau of the Budget and the Civil Service Commission.

The Context Within Which the Controller Functions

The air traffic controller is a central element in the existing system on which the safe and expeditious movement of air transport in the United States rests now and for the immediate future. This system

includes the planes and the pilots who guide them; the air space through which the planes travel; the airports and the men who operate them; the facilities and equipment with which the controller performs his function; the maintenance technicians who keep this equipment functioning; and finally the organization, i.e., the Federal Aviation Administration, which supports, directs and coordinates the air traffic system.

It is this system that establishes the demands made upon the controller. These demands are affected by the growth in the number and types of planes, the capacity and efficiency of runways to accommodate them, the efficiency or even adequacy of the facilities and equipment provided, and the caliber of administrative leadership and support afforded. What is expected of the controller and his capacity to meet this expectation are markedly influenced by each other element of the system.

The current and continuing work situation of the controller can only be appraised within that context. For the immediate future there are four major determinants of the nature and volume of work placed upon the controller:

1. Air Traffic 1970-72 - The gross volume of aircraft operations to be handled by FAA-manned airport terminals is estimated to increase more than 30% by the end of FY 1973. The traffic handled by en route centers is forecast to increase approximately 20% within this same time period. The task of the controllers will be aggravated not only by this substantial increase in volume, but as well by a changing "mix" of air carrier, general aviation and military traffic; by the increased congestion around 22* geographical areas

* New York	Miami/Fort Lauderdale	Kansas City
Chicago	Detroit/Ann Arbor	Houston
Los Angeles	Pittsburgh	Seattle/Tacoma
Atlanta	Philadelphia	New Orleans
Washington DC/Baltimore	Denver	Cincinnati
San Francisco/Oakland	Cleveland	Las Vegas
Dallas/Fort Worth	St. Louis	Minneapolis
Boston		

within which close to 70% of all passenger enplanements occur; and by the need for more complex procedures to abate the noise caused by air traffic over densely populated areas.

2. Airports 1970-72 - Efficiently planned airports with ample, well located runways make less difficult the task of routing air traffic into and out of congested airports. The need is for more and better designed airports, and for additional runways on many existing airports as the volume of air traffic increases.

The prospect for any material improvement in the number of airports, in their design or in the expansion of runways for the next three years is starkly limited. A maximum of 89 million dollars has been authorized during the fiscal year ending June 30, 1970, for Federal grants for airport construction and modernization. If supplemented at the normal matching rate by local funds, the aggregate would meet little of the urgent immediate need.

3. Facilities and Equipment 1970-72 - The caliber of air traffic control facilities and equipment also determines the nature and volume of work placed upon the controller. During the next three years, however, present plans call only for:

- The construction or relocation of 57 additional airport towers, the installation of radar in 39 of the existing towers, and the introduction of ARTS II* equipment in 14 towers and ARTS III* equipment in 17 towers;
- The creation of 222 additional sectors in existing air traffic centers, the introduction of 7 additional long-range radar and 166 communication channels, as well as the introduction of NAS Stage A* equipment in 5 existing centers.

Although this planned upgrading of existing facilities and equipment is clearly desirable and important to air safety, it will not significantly alter the nature of the job to be performed by the controller in

* Stages of the eventual automation of the control system.

most of the facilities in those geographic areas where air traffic is concentrated.

4. **FAA Resources and Leadership** - The prospect is that the resources available for the operation and development of the air traffic system will grow during the fiscal years 71-72. If legislation currently pending in the Congress* is passed, and it is predicted for passage sometime this spring, a new source of revenue will be provided through the enactment of user charges. As stated in the report of the Senate Committee on Commerce, this legislation will provide an estimated \$650 million in the first full year of the program. Of this sum, \$300 million a year is tentatively allocated for the construction and modernization of airports, \$250 million for the addition of air navigation and air traffic control facilities and equipment, and \$50 million for research and development on technology that will be urgently needed in future years. These additional funds, however, will continue to be dependent upon the recommendations of the Bureau of the Budget, the actions of the President and the Congressional appropriations process.

In short, although the revenues from user charges may be expected to provide a significantly improved financial environment in the years ahead, they will not, because of long procurement, construction and installation lead times, significantly alter the burdens of the controller within the next two or three years.

The current management of FAA is to be congratulated on its success in achieving - within one year's time - both substantial increases in the number of controllers authorized and virtual enactment of the Airport and Airways Development Act. Much, however, remains to be done before it can be said that FAA has developed a management system adequate to support its leadership responsibilities. The

* Proposed Airport and Airways Development Act of 1969 (S-3108).

Committee noted throughout its study significant deficiencies in the quality of FAA's labor/management policies and procedures, its personnel administration and research and its internal system of communications. Specifics in these and other areas are discussed throughout the report.

The Controller's Talent and Role

The Committee is impressed with the fact that air traffic controllers constitute a unique group within the Federal establishment. While many other categories of Federal employees must possess some of the talents, and while their jobs impose some of the exacting responsibilities which make the controller's job difficult and demanding, few combine as many sustained demands upon the individual as does this job.

Individuals who serve successfully as air traffic controllers possess talents and aptitudes available in a limited proportion of the total adult population. They appear to have, at the least:

- A highly developed capacity for spatial perception - for visualizing the relationship in space of several planes traveling at various altitudes and speeds;
- A keenly developed, quick and retentive memory - for holding in mind the data which identify and locate the aircraft immediately under control;
- A capacity for articulate voice communication, coupled with decisiveness for stating clearly and promptly to a pilot the guidance needed for effective and safe navigation of the aircraft; and
- A capacity for mature judgment which carefully balances the objectives of safety with the need to move traffic expeditiously.

There is compelling evidence that many controllers work for varying

periods of time under great stress.* They are confronted with the necessity of making successive decisions carrying life and death consequences within very short time frames. This situation is particularly prevalent in the facilities that control air traffic in those 22 geographical areas where the bulk of commercial aviation operations takes place. The job, unlike most, requires constant standards of perfection, and even when traffic conditions are not particularly demanding, the controller in many facilities is anticipating a deluge which will tax his capacity to perform in a thoughtful and safe fashion.

Secondly, the schedule of most terminals, centers and flight service stations requires that the facility be staffed on a 24-hour, multi-shift basis throughout the week. Although not an uncommon condition of employment, frequently changing shift requirements add to the day-in-day-out wear and tear on the individual and to the disruption of his normal family and social relationships. These factors are responsible for the pervasive belief among controllers that they will "burn-out" between the ages of 40 and 50, be unable to continue controlling traffic, and have no alternative means of support.

* Dr. A. D. Catterson, a member of the Committee, and currently a Flight Surgeon of NASA, after reviewing the results of a physiological study of the stress hormone levels measured in the urine of controllers serving in the O'Hare Terminal in Chicago, in comparison with similar studies of NASA astronauts, has concluded that: "These data provide clear cut evidence of a strong biochemical response by the air traffic controller personnel, who were the subjects of this study, to conditions which were perceived within their bodies as acutely stressful." This is discussed in greater detail in Appendix XVII.

These demands of the job upon the man are present, in one degree or another in some other jobs - both public and private. Yet, we are of the view, that the controller work force is unhappily distinctive in the concentration and intensity of such demands. In this nation's rapidly growing air transport system, the journeyman controller has been forced to compensate for the deficiencies of other elements of the system as air traffic has grown - for the lack of or inefficient design of airport runways, for the inadequacy of equipment, and for the lack of resources that would provide more efficient equipment and a fuller complement of controllers.

MANNING THE AIR TRAFFIC SYSTEM

All that is now known of air traffic technology makes it clear that the effectiveness of air traffic control will depend at least until the 1980's, upon the effectiveness of the controllers themselves. Yet many control facilities have been, and continue to be (as of January, 1970) seriously understaffed, especially with qualified journeymen controllers. The shortage of trained manpower has required management to establish working arrangements which impose unjustifiable burdens on the limited number of staff available in some facilities, particularly on those fully trained and qualified. This in turn has given rise to the widespread feelings of dissatisfaction among the controllers.

Inadequacy of Method of Determining Staff Needs

As demands on the air traffic control system have grown, the total on-board staff of controllers has increased from 17,000 in June, 1967, to over 21,000 as of December 31, 1969. (See Appendix IV.) Appropriation legislation for FY 1970 is expected to provide authorization for additional positions, bringing the number of individuals authorized for centers, towers and stations to over 23,000 as of June 30, 1970.

Any discussion of the adequacy of this authorized staff raises question as to the manner in which staff needs are determined and existing manpower is utilized. A recent report by a task force*, composed of representatives of the Department of Transportation, the Bureau of the Budget and the Civil Service Commission and the FAA, concluded that existing methods are inadequate for determining the staff required for individual air traffic control facilities. This Committee concurs on the basis of its observation of most facilities visited.

* Steering Committee for the Review and Validation of Air Traffic Staffing Standards.

The Committee also noted evidence of a number of discrepancies in manpower utilization policies and practices in the various facilities visited and/or surveyed. These include marked variations in the proportion of fully qualified journeymen authorized to staff each of the facilities, and in the lack of any standards of productivity expected of controllers. Illustrative of the differences in staffing patterns is the provision in the Great Falls and Seattle centers of approximately six journeymen out of every ten employees in the total authorization, while in the Albuquerque and Fort Worth centers approximately eight journeymen are provided out of every ten employees. No apparent characteristics of the work loads of these centers appear to explain these variations.

A marked variation in the actual productivity of center controllers (see Appendix V) is an example of the lack of any established standard of performance to guide manpower planning. There appear to be no set measures or standards as to how many controllers should man each sector. Controllers interviewed often complained about two men manning three-man sectors. But no information exists to indicate how widespread a problem this is. And the lack of any correlation between the amount of overtime worked by controllers in individual facilities and other measures of the manpower available underline the FAA's inability to determine reliably the staff needed.

In short, the FAA possesses no adequate method for determining what staff is required for effective operation, nor has it developed standardized approaches to utilizing efficiently that level of staff which it does have.

Critical Shortages

The lack of authorized staff is especially apparent in a limited number of facilities responsible for handling the air traffic into and out of major population centers. We noted evidence of this deficiency in staff in the unfilled positions in the facilities, in

the requirement that available employees work overtime, in the curtailment of training, in the denial of employee's requests for leave, and in refusals to allow employees to transfer from some facilities. These shortages can be expressed not only in terms of total authorized positions unfilled, but in terms of shortages of fully qualified journeyman controllers. Chicago's O'Hare terminal was by far the worst off, with only about 70% of its total authorized (1969 level) positions filled, and 44% of its journeyman authorization filled. La Guardia, San Francisco and Denver terminals are suffering from shortages exceeding 20% of authorized journeyman levels. Both Chicago and Indianapolis centers were short approximately 10% of total staff and 35-40% of journeyman staff authorized.

Shortages in journeymen as well as total staff tell only part of the story. At these facilities not only is the number of fully trained controllers on board insufficient for the handling of traffic, but those journeymen on hand are also required to assist in training large numbers of developmental controllers.* This situation places an additional responsibility, in the form of training, on the already over-worked journeymen.

The impact of double demands upon journeyman controllers is graphically illustrated by these examples. At the Houston center as of September 30, 1969, the number of positions filled approximated the number authorized; however, only about 75% of its journeymen positions were filled, and the number of developmental controller positions filled was almost three times the number of positions authorized for developmental controllers. The Fort Worth center was

* "Developmental controllers" refers to those individuals who, after preliminary training, are serving an apprenticeship during which they assist on limited control assignments and participate in on-the-job training. As of December 31, 1969, there were about 4,700 developmentals in the system.

short about 20% of its journeyman authorization but had almost four times as many developmental controllers on hand as were authorized. (See Appendix VI.)

Of all centers in the continental United States (excluding Alaska), the twelve facilities handling the greatest volumes of air traffic accounted for over 80% of the total shortage of journeymen and the bulk of the excess of developmental controllers. While other facilities suffer shortages in requisite staff, the shortages in these high density centers warrant that immediate attention be focused on these facilities.

The present journeyman controller shortage and simultaneous excess of developmental controllers above the authorized level can be explained by a) the failure to recruit and train new controllers during the 1962-67 period, and b) the substantial recruitment of new controllers since late 1967. This explanation does not account, however, for the striking variation in the size of staffs at several facilities. For example, while on September 30, 1969, the number of employees in the Oakland terminal exceeded the number of positions authorized, in Chicago's O'Hare terminal (as previously mentioned) only about 70% of the authorized positions were filled. Among the centers, the Atlanta center had approximately 110% of its authorized positions filled, Indianapolis had fewer than 90%.

Attrition

The FAA reports that, on the average, approximately 3% of the total staff of the Air Traffic Service is lost each year. This measure of personnel attrition obscures important differences in the rate of loss of employees in distinguishable groups and among types of facilities within the system. Knowledge of these differences is important both in defining the locus of the difficulty and the action needed to correct it. The Committee's analysis of available data reveals significant differences in rates of attrition of developmental and journeyman controllers at both towers and centers. These

differences are indicated by the following table which shows (on the basis of data available for the nine months January to September, 1969) that annual attrition rates -

<u>In 15 Centers were:</u>		<u>In 15 Towers were:</u>	
For Developmental Controllers	For Journeymen Controllers	For Developmental Controllers	For Journeymen Controllers
23.2%	0.3%	22.6%	0.7%

A longitudinal analysis of the attrition made by following all employees hired for the Air Traffic Service during the period January 1, 1967, to November 30, 1969, indicated losses as high as 23% of those recruited in some regions.

<u>Year of Hire</u>	<u>% Range of Attrition among New Hires among Regions</u>	
	<u>Low</u>	<u>High</u>
CY 67 (6 mos.)	6	19
CY 68	5	22
CY 69*	13	23

The attrition among individuals hired for and assigned to the centers is especially high (see Appendix VII) and much of this attrition occurs as a result of their failure in training at the Academy. There the failure rate for the last three center classes has been as high as 30%. Put in other terms, the FAA, with some regional variation, is losing a steadily increasing proportion of its new hires within one to three years of their entry on duty.

Systematic information as to the reasons that account for this attrition is totally lacking. The relatively high rate of attrition

* To June 30, 1969

obviously raises doubts as to the efficiency of the processes used to recruit and select individuals for employment. Whatever the causes, the attrition among developmentals at both towers and centers in high density locations results in higher costs for recruiting, selection and training, with the FAA receiving little long-term pay-off for a large initial investment. It results also in frustration experienced by the personnel of facilities who carry the added on-the-job training burden, much of which they know is for naught.

Recruitment - Rate and Approach

From June, 1967 to December, 1969, the total number of employees in centers, terminals and stations was increased by over 4,000. The prognosis for accomplishing the substantial further increase in staff, however, is not bright. The Air Traffic Service's current rate of growth and its approach to recruitment offer little promise that it will be able to fill by June 30, 1970, the 3,800 additional positions anticipated for the fiscal year while replacing those employees lost due to attrition. Moreover, the already high rate of attrition among new recruits will continue to exact a toll on the energies of the FAA and its staff, if current recruitment and selection processes are maintained.

The current process for the recruitment of controllers starts with the "announcement" of an examination by the nineteen Civil Service Commission (CSC) Interagency Boards, and includes a written examination (of those required to take it) and the rating of the experience claimed by applicants (who are not required to take the examination) by panels of experts convened periodically for this purpose. Those who qualify are placed on a "register".* Upon request by an FAA regional office, the appropriate Interagency Board extracts names from the register or solicits additional applications to provide qualified applicants from among which FAA officials may fill vacancies. Experience indicates that one of every three applicants is placed on

* Further discussion of the establishment of registers is contained under the section on Selection, pp. 38-50.

the air traffic controller register.

During the period from June 30 until November 15, 1969, 4,156 names were added to the Civil Service registers as eligible for hiring at either the GS-5, 7 or 9 levels.* At this rate it could be expected that about 1,000 eligibles might be added to the registers per month. Excluding the normal duplications of individual eligibles on more than one register (e.g., the same individual may be qualified at Grade GS-5 and GS-7) the CSC estimates that this total of 1,000 new eligibles will represent about 700 individuals per month. This rate, combined with unduplicated eligibles already on the register as of November 1969 (about 7,000), means that approximately 12 thousand individuals may be available for recruitment between November and June, 1970. Since no more than one of every four individuals certified from these registers is chosen by FAA and then accepts employment, it follows that the number that can be hired by June 30, 1970 will not likely exceed 3,000.

Yet the need is for approximately 3,400 individuals to be added to the staff of the Air Traffic Service by June 30, 1970, in addition to 800 to 1,000 to replace attrition. These data clearly suggest that with no change in current recruitment methods the number of employees needed will not have been recruited by June 30, 1970. If the agency should adopt more stringent hiring standards, especially with regard to age, the shortfall will be even greater. (In the Selection section of this report, pp. 38-50, four problems in the recruitment and selection effort are described.)

Finally, the recruitment of personnel for the Air Traffic Service has been marked by very large variations in the numbers hired from month to month during the budget year. For example, in FY 1969 approximately 250 individuals were hired during the first quarter; almost 800 during the second quarter, 250 during the third quarter, and more than 1,500 during the last quarter. This on-again-off-again

* Data as to the additions for prior months are not available.

pattern of recruitment prevailed as well in the last half of FY 1968. (See Appendix VIII.)

The lateness in the appropriation of funds by the Congress is given as a principal cause of this variable recruitment. But our observations suggest that the rate of recruitment could be smoothed out administratively, at least after receipt of the appropriation, and that better planning and execution of the recruitment effort would permit better selection and more economical and efficient induction and training of recruits.

Recommendations

To alleviate the serious understaffing of facilities, particularly those which handle the bulk of this country's air traffic, the Committee recommends the following actions.

1. For those facilities with serious shortages of journeymen controllers (e.g. Aurora, O'Hare) immediately detail qualified journeymen controllers from more fully staffed facilities for extended periods (at least one year following the necessary qualification training). If a sufficient number of controllers will not voluntarily accept such details, we recommend that qualified individuals be involuntarily assigned, beginning with those with least seniority in employment. Seniority should be based on a national standard.

To reduce training time at the new installation, those assigned should be trained in a much more limited area of specialization than the regular journeymen in the facility to which they are detailed. Controllers selected for details should be employees at the GS-12 level. Pending the development of other benefits recommended in this report, the individuals detailed should receive every available monetary benefit, such as per diem allowance and a temporary promotion to GS-13.

2. The total volume of applications from which qualified applicants

can be recruited should be increased by working with the Office of the Secretary (OST) and the CSC to:

- a. Seek out and develop additional productive sources of recruits and launch an aggressive nation-wide recruitment publicity campaign.
 - b. Expand the existing program that encourages and/or assists in the development of air traffic controller programs at two-year colleges, with concurrent work assignments at ATC facilities. FAA should also consider providing loans to enrollees in such programs, along with provision that the individual may be forgiven his indebtedness after he has served three years as a controller. Such a program should include guaranteed employment after successful completion of study. It should be directed to two-year colleges, including those with large numbers of students from minority groups.
3. The development of a new and improved system of determining the staff required in air traffic control facilities is an urgent need. To meet that need the Committee endorses the recommendations of the Steering Committee mentioned on p. that:
- a. The OST/FAA undertake immediately a study of ways and means of redesigning work loads to equalize work load both between positions and on individual positions during any shift, and
 - b. A "standards development program ... be established promptly so that each facility has the capability to install customized staffing standards considering environmental and operating characteristics of the facility".

4. The staffing requirements system that is developed should, after establishing a minimum standard of productivity for controllers, provide adequate allowance for the staff required to permit reduction of overtime, for training, for regular FAM trips* and for annual leave, as well as for a work-day which includes no more than two hours consecutively on any stressful control position and no more than six hours per day in total on a position. "Stressful" positions should be established by national standards.
5. Once the needs of the system have been determined, the OST/FAA should seek the agreement of the Bureau of the Budget as to the bases on which the staff required will be determined annually. It should seek a commitment from the Bureau to support funding levels and staffing ceilings over these immediate requirements which will adequately allow for the long training lead time needed to meet future requirements.
6. The FAA should give priority to the development and conduct of an accelerated training program for increasing the capabilities of developmental controllers. This action is required to relieve the facilities and their staffs of the burden represented by large numbers of partially trained employees.
7. Individuals recruited to the Air Traffic Service should be made to understand prior to employment that they may be assigned anywhere in the system at any time. While this is the current policy of the FAA, it is not enforced. On completion of training the new employee's preference for assignment should be given consideration but final decision should be based upon the needs of the Service.
8. The Air Traffic Service should fill all staff and supervisory positions at Grade GS-13 and above, absent unusual circumstances, exclusively from among controllers who have served a minimum of five years at high density facilities or who are part of the Managerial Training Corps described on page . This course of

* Familiarization Flying Program through which controllers are authorized to fly in commercial or private airplane cockpits to become familiar with in-flight control procedures.

action will a) provide an incentive needed to attract controllers to serve in persistently understaffed facilities and, b) in the long run develop a more broadly qualified staff and supervisory force.

Further recommendations with regard to the recruitment and selection process are discussed in the Selection section below.

THE CONTROLLER'S CAREER

Perceptions of the Controller

Both from field visits and from the numerous written communications, the Committee was impressed by the intensity and extent of the controllers' dissatisfaction with the air traffic control system and their assigned role within it. This contrasts markedly with an apparent high level of motivation towards the job itself. The size of the facility in which the individual worked appeared to have little relationship to the degree of bitterness directed at the system.

Working conditions, most controllers contend, are unsatisfactory. They place excessive demands upon the individual without providing essential breaks, either during the workday or in between the times when they change from one shift to another, especially at the end of the 2-2-1 shift cycle.* In the view of controllers, the acuteness of their plight is symbolized by their being called upon to work overtime hours, even when they had been subject to extreme traffic pressure during regular working hours.

They are forced to work with obsolete, inadequate or insufficient equipment that adds to the stress they experience. Their vacations are limited in duration and often must be scheduled at times other than the summer months when children are out of school.

The influx of untrained recruits to cope with the increasing workloads has not reduced the burden they bear, as they see it, since they must assume primary responsibility for training the new employee. And the flights on commercial airliners programmed by FAA to increase the controllers' familiarity with in-flight control procedures (FAM trips), are severely limited because of the shortage of staff. They foresee no respite as projections of future air traffic continue to rise.

Less often do the controllers complain of the level of compensation

* See p. 31 for discussion of the 2-2-1 shift.

provided. Many or most controllers complain, however, that the present system, under which the maximum compensation of the controller is related solely to the volume of air traffic served by the facility, is inequitable. The controllers in the lower density facilities contend that the complexity and the responsibilities of the job should not be measured by volume alone. They contend that the workload they carry, if measured appropriately, is equal to that of the controller who serves in a high density facility.

On the other hand the controllers in the high density location voice a concern as to the lack of incentives to attract the experienced controllers from smaller facilities. They contend that the recognized inability to attract controllers to the larger facilities is evidence that those who serve in these facilities are being inequitably treated. The system should, they argue, equitably compensate individuals for the more complex work they perform and aid them in meeting the higher cost of living in the areas where these facilities are frequently located.

As controllers see it, the training provided for those entering and those serving within the Air Traffic Service is inadequate. Entry level training, some contend, does not equip the individual for the work. Subsequent training, e.g., periodic training to maintain and build proficiency, is pictured as "sporadic and haphazard". Even more often, controllers complain of the lack of supervisory training that would increase the effectiveness of present day supervisors or would equip others to serve eventually as supervisors.

The prospect of a relatively early end to their working careers as controllers is an especially disturbing element. Most controllers agree that they will "burn out" at a relatively early age (e.g., 40-50) because of the loss - as a consequence of age - of those unique capabilities required by this job.

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The controllers feel that the FAA should provide the aging controller an opportunity to transfer to less arduous work at no loss in grade or pay, or to other positions within the FAA when they can no longer perform proficiently as a controller. They recognize the relative non-transferability of their work experience and feel that they are entitled to retraining for other assignments. For those individuals who cannot be retrained and reassigned, they ask the FAA to provide the option of early retirement at a reasonable annuity. This retirement, they claim, must come at an age which will preserve the safe and expeditious flow of traffic because the growing caution of an older controller and the loss of mental agility constitute a hazard to handling dense high-speed traffic. Proof of this, controllers contend, is to be found in a succession of medical studies conducted over a number of years, the results of which, they say, have been withheld for reasons known only to officials of the FAA.

The last allegation reflects a distressing lack of confidence and respect on the part of many controllers toward those responsible for the management of the agency in which they serve. They contend that their dealings with "management", whether attempted through their organizations or as individuals, are ineffectual. They voice the view that little or no action is taken in response to their requests or complaints, and that employee organizations are suppressed insofar as is possible. "Management" in the eyes of a substantial proportion of all controllers, is out of touch with the working force.

Obviously, any attempt to express the views of all controllers is subject to error. Doubtless some controllers are much more satisfied with their careers than is suggested by the views reported here, and those who express dissatisfaction reflect varying degrees of discontent. Yet the Committee reports these views because it believes that awareness of them is central to the building of a more

productive and harmonious work force.

Working Conditions

For a work force which is expected to perform tasks that at times are exacting or even extremely stressful, the conditions under which its members work are of special consequence. Hence, this Committee observed in the centers, terminals and flight service stations it visited and through the analysis of much additional data, the following factors:

- The environment - the buildings and structures within which the controller works, the quality of lighting, levels of noise and other physical and psychological factors.
- The control equipment used - the kinds and qualities of radar and communications equipment upon which the controller relies in controlling air traffic.
- The practices prevailing as to the design and scheduling of work shifts, days off, rest breaks and meal periods, scheduling of vacations and other leave, and medical examinations, that affect the physical demands made upon the controller.

Psychological Environment

The impact of working conditions on controllers in the en route traffic control centers - unlike terminals and stations - is more psychological than physical. Most centers are housed in modern air conditioned buildings built within the last decade, but the center controller, unlike his counterpart in the terminal or flight service station, does not see an airplane while on duty. He works in a large windowless room filled with radar scopes and associated communications equipment. His only contact with pilots is by radio and their conversation is of necessity limited to the actual control situation. He seldom sees the chief or assistant chief of the center except by specific appointment, and few of these officials come to know the relatively large number of controllers they supervise.

Controllers on different crews frequently are not acquainted with each other. The center controller is expected to focus his attention throughout his hours on the job or the tasks he is assigned. Few pilots or other aviation representatives have occasion to visit these remotely located centers.

The terminal controllers and station specialists, on the other hand, work in a much different environment. The terminal controller, with few exceptions, will spend part of his shift in the tower cab where he can observe the movement of aircraft and other activities on the field. His job may enable him to come to know pilots and other persons associated with the operation of the airport. The station specialist deals directly with pilots and other persons at the airport. The relatively small number of controllers employed in each terminal and station enables each to come to know and develop social relationships with his fellow workers and with supervisors.

In short, terminal and station specialists work in an environment which tends to satisfy in fuller measure the psychological needs of some individuals. Conversely, the center controllers operate in a "de-humanized" environment which tends to aggravate other causes of discontent. This contrast is reflected in the frequency with which center controllers seek to transfer to other facilities and the lesser frequency with which terminal or station controllers voice a desire to transfer to centers.

Physical Environment

Several newer terminals and stations provide controllers an attractive and efficient physical environment. Most older towers and stations, however, offer poor surroundings in which to work. The lighting, ventilation, noise levels and crowding in radar approach control rooms in the older facilities are a source of constant irritation. Because available financial resources have been concentrated on the development of the forthcoming automated

air traffic control system, many badly needed improvements have been deferred. For example, there has been no new authorization of funds for the construction of towers since FY 1967. The prospect is, however, that limited new obligational authority will be available within FY 1970 for these purposes.

FAA has attempted to improve the environment in these field facilities by painting, installation of new lighting, introduction of noise suppressant ceilings, carpeting and other items through what is called "Operation Bootstrap". Unfortunately limited funds, limited personnel, and other project delays have meant that many facilities have yet to experience significant improvement.*

Control Equipment

The kinds and qualities of radar and communications equipment on which controllers must rely are additional factors which aggravate working conditions. The critical tool upon which many controllers depend - the radar - is at the best an imperfect instrument for air traffic control, and in some facilities provides the controller an incomplete or confusing view of the air space he must control. The radar maintained by military installations that is jointly used by FAA field facilities is unsatisfactory for the control of civilian air traffic in numerous instances. Radio frequencies are also often without reliable back-up except perhaps through other sectors.

Much equipment now in place has been installed with little effort to design it to meet the particular needs of the controller. Switches and other devices, as well as the consoles used by the controller, reflect in their design and location little apparent consideration of the function to be performed by the individual. And within the centers, sectors controlling adjoining airspace are often physically separated, thereby causing problems of coordination.

* See Appendix IX comparing requested and authorized improvements.

The limitation of funds has made it possible to improve the equipment available to controllers in only a limited number of facilities within the past fiscal year. For example, in selected terminals and centers the following items of equipment were added:

- 9 VOR systems (navigation aids),
- 4 instrument landing systems at airports,
- 4 towers relocated and 4 new towers constructed,
- 4 flight service stations relocated,
- 75 Brite I radar displays in tower cabs,
- 1 airport surveillance radar system (ASR),
- 2 ASR systems relocated, and -

FAA hopes to replace the military radar facilities now being used by facilities with new solid-state radars at a rate of 12 each year commencing in FY 1972.

Management Policies Affecting Working Conditions

Perhaps of even greater consequence to the physical well-being and the morale of the controller are those policies maintained by the FAA that determine the length of the work period, the frequency with which the individual is rotated from one shift to another, the availability of time off the job, the availability of work time for familiarization flights (FAM Trips), and the frequency and caliber of medical examinations to determine an individual's capacity to continue on the job.

Length of Work Periods - The FAA policy governing "breaks" in the work period is set forth in the Facility Management Manual (7210.3). This provides that:

"ATC specialists who operate continuously under heavy control or flight services workloads have their operating efficiency impaired due to various forms of fatigue. Facility chiefs shall within manpower resources available and when traffic workloads warrant, use all available personnel to provide relief periods.* Each employee shall

* This sentence unfortunately implies the persistence of a shortage of staff which the Committee hopes FAA does not accept as inevitable.

be considered in an on-duty status while on one of the relief periods, provided he is not completely excused from duty at the facility and is close enough for his service to be called upon if required."

As a basis for enforcing this policy, it is further provided that the controller shall indicate on an appropriate form the time he commences work on a particular position and the time he leaves that position for any reason. Because this required time reporting is honored mainly in the breach, and because time on the position is reported differently at many facilities, the Committee's findings on the actual length of unrelieved work periods for a representative number of controllers is of questionable reliability.

Analysis of the data, however, together with observations in the field, the testimony of controllers and the results of some earlier studies lead the Committee to conclude that the problem is one of regularizing, rather than the giving of, relief breaks. The length of work periods depends now upon the volume of air traffic, the number of employees on duty, and to a lesser extent on the interpretation of prevailing policy by the management of the local facility. It is clear that when a controller is called upon to handle a heavy volume of traffic, neither his own well-being nor the safety of air traffic is served by continuing him on a position for an extended period without relief.

Rotation of Shifts - FAA's policy has required that controllers be periodically shifted among the various shifts during the 24-hour workday. The rationale underlying this policy is not stated. Our inquiries reveal these possible bases for the policy:

- The controller's proficiency will better be maintained if he works traffic loads during all times of the 24-hour day.
- The controller can periodically be relieved from the heavy traffic loads on the day and evening shifts by occasional assignment to the midnight shift.
- All controllers should have equal opportunity to earn the

differential pay associated with night work and the premium pay earned by those who work Sundays.

Facility chiefs are allowed considerable latitude in determining how shifts and days off will be rotated. This latitude results in the maintenance of a variety of practices in the several centers, terminals and stations. Our observations indicate that a majority of facilities rotate between the day and evening watches on a weekly basis and to the midnight shift once every five or six weeks. Some facilities use what is described as the "2-2-1" basis for rotation, i.e. the individual works two 4:00 p.m. to midnight shifts, two 8:00 a.m. to 4:00 p.m. shifts and then a midnight to 8:00 a.m. shift. Most facilities rotate days off; while a few facilities assign fixed days off to each controller. Of the 53 facilities surveyed, only one permits controllers to remain on fixed shifts, excluding the midnight shift.

Controllers complain particularly of the "short turn-around" on the 2-2-1 rotation. Prior to the midnight shift the individual has only eight hours in which to drive to and from work, eat and sleep. (The same situation prevails when an employee is scheduled or called in to work overtime with only an 8-hour interval between shifts.) Some controllers, however, prefer the 2-2-1 shift arrangement because it affords a long weekend between work weeks.

In addition to the varying practices on shift rotation, considerable variation is reported in shift starting times. A review of the practices of 53 facilities indicated that 4 facilities started shifts at nine different times during the day, 4 facilities at eight different times, 37 facilities started shifts at from four to seven different times, and eight facilities had only three starting times.

In the Committee's opinion, the frequent rotation of the individual from one shift to another is a questionable practice.

A growing body of scientific evidence from studies of human work-rest cycles, as well as the preponderance of anecdotal evidence in this area, indicates that when an individual changes the starting time of his daily work-rest pattern by eight hours or more, his physiology requires anywhere from three days to a week to adjust to the new schedule. The practice of constantly changing shifts at frequent intervals, with the attendant disruption of family living patterns and lack of opportunity for adequate rest, places the employees in a state wherein their physiological-biochemical systems are continuously out of phase with their changing living patterns. This places a strain on the individual's physical well-being, limits his capacity to perform effectively and may endanger the safety of air traffic.

The Committee has been unable to find the results of any thorough research as to the effects of various approaches to rotation of shifts upon the productivity and physical well-being of controllers. Nor has it discovered any planned effort by FAA to ascertain the effect of various shift assignment policies on employee morale and satisfaction. The problem is of sufficient importance to warrant more analytical attention than it has received.

Policies governing shift assignments must be related to operational needs, but the Committee is convinced that these policies so significantly affect the well-being and morale of the employees as to warrant carefully planned physiological and attitudinal fact finding.

Availability of Time off the Job - In view of the demanding nature of the controller's work, the opportunity to take leave periodically from the job is important to the well-being of the individual and to the maintenance of his productivity. This obvious fact is recognized in the avowed policy of the FAA to permit the controller to take such leave as he becomes entitled to. However, the Air Traffic Service, like other service industries, is confronted

with peak periods when staff can ill be spared. This condition is aggravated by the shortage of qualified staff which has prevailed during recent years in many or most facilities. Despite the shortage of staff, however, the Committee's survey indicates that almost all controllers requesting leave were permitted to take some portion of this leave during the summer months. (In this connection, the Committee was unable to validate the oft-stated complaint of controllers about their inability to get "prime-time" vacations.) (See Appendix X.)

Familiarization Flights - The "familiarization flying program", authorized in Part 224 of the Civil Aeronautics Board Economic Regulations, was established to acquaint controllers and aircraft communicators, without charge to the FAA, with the problems affecting the in-flight use of air traffic control services. FAA regulations limit a controller to a total of four FAM trips per year, and the CAB regulations limit a controller to one flight a year on a particular air carrier.

Complaints about the administration of the "familiarization flight" program were voiced by controllers at most field facilities visited by the Committee. In general, controllers complained that 1) the policy regarding "familiarization flights" is applied in varying fashion by the several regions and facilities; 2) controllers are seldom permitted to take "familiarization flights" despite the policy; 3) the requirement that the application be submitted more than ten days in advance is restrictive; and 4) the individual who undertakes an FAM trip on his own time is unduly limited in the time he is permitted to remain at the outbound destination. To assess these complaints the Committee asked 15 centers, 21 terminals, and 21 flight service stations to supply information concerning utilization of the FAM flight program by their controllers during the nine month period January 1 - September 30, 1969. The information furnished by those facilities disclosed some variations in the

administration of the FAM flight policy, but not to a significant degree. As the following table shows there is no indication that controllers are seldom allowed to take these flights.

	Total controllers	FAM trip requests*	FAM trips approved	% taken on duty time
Terminals	1,477	516	495	54%
Centers	7,538	1,486	1,442	5%**

Most station specialists are not eligible to participate in the program***, but many expressed a desire to participate, claiming that they also work closely with the users of the airways.

Contrary to the complaints voiced, the Committee's inquiries indicate that neither the application process nor the time away allowed (in view of current staffing shortages) are unduly restrictive. Most facilities authorize controllers to remain at the outbound destination no more than 48 hours; a few facilities authorize a stay of as much as 96 hours. The disappointment in the program may be attributed more to its limited positive use by the FAA, than to the procedures governing the approval and administration of trips.

Periodic Physical Check Ups - FAA regulations require that controllers take and pass an annual medical examination. This program

* The Committee recognizes, however, that this may understate the demand, since it includes only formal requests and excludes an unknown number of informal requests which were discouraged.

** Possible discrepancy due to manner of reporting trips taken partly on leave time. Also appears to be related to staff availability.

*** Station specialists who provide air traffic services to air carriers at airports without towers are eligible.

is carried on to provide the individual with a periodic opportunity to learn of any conditions requiring correction and to ensure the FAA of the physical capacity of employees performing vital functions. The examinations are generally administered by private physicians who have been designated by the FAA as Aviation Medical Examiners, and their fees are paid by the FAA.

The quality of the examinations, both in the opinion of the controllers and of the responsible officials of the FAA, varies greatly in thoroughness and reliability. The agency plans to overcome this deficiency partially, over the next two fiscal years, as full-time physicians are assigned by the FAA to the centers. These physicians will be expected to conduct more thorough, and perhaps more frequent examinations of personnel in the centers, and in the terminals within easy access of the centers. Monitoring will be required to ensure that meaningful examinations are provided for other terminal and flight service station controllers.

Recommendations

Fundamental to the alleviation of the unrest and demoralization that is now apparent among a substantial proportion of the controllers in FAA facilities - as well as to give greater assurance to the flying public of the reliability of the air traffic control system - is early improvement of working conditions in these facilities.

1. To reduce the physical demands placed upon the controller, the Committee recommends first and foremost that FAA take such steps as may be necessary to ensure that -
 - a. A controller not be required to spend more than two consecutive hours on a stressful, high-activity, control position.
 - b. A controller not be required to spend more than six hours during a shift on control positions. The remaining two hours should be devoted to non-operational duties,

training and appropriately spaced rest breaks.

- c. Controllers be encouraged to utilize fully the annual leave they are entitled to under law, in order to offset the wear and tear this job imposes on the individual. To encourage their use of vacation leave, each controller who so desires, should be assured at least one week of vacation during the prime summer vacation months; to make such assurance possible, funds should be budgeted to permit leave during this period.
- d. Greater use of FAM trips be allowed by the FAA to provide greater understanding of the pilot's environment by controllers. As rapidly as the staffs in facilities can be increased, the objective should be to provide each controller with at least one FAM trip on regular duty time each year. In addition, facility chiefs should encourage controllers to utilize FAM trips to obtain increased familiarity by taking such trips while on annual leave, and no limitation on the duration of such trips should be invoked.
- e. Prevailing shift rotation practices be modified to extend the time intervals between shift changes. More specifically it is proposed that individual facilities be encouraged, in consultation with the employees and representatives of their organizations, to amend prevailing practices to:
 - Provide longer intervals between rotations (i.e., instead of weekly or less, rotate quarterly, semi-annually, or annually). It is recognized that under this arrangement suitable adjustments will be necessary in rotation to the midnight shift.
 - Permit a combination of fixed and rotating assignments based upon individual preferences to the extent such

arrangement is compatible with efficient operations.

- Permit indefinite assignments to shifts based upon some form of seniority system, such as total service within FAA.

Simultaneously, we recommend that the FAA Administrator direct and fund the Aviation Medicine Service to undertake, after consultation with industrial health specialists of the Federal Health Services and Mental Health Administration and with industry, an intensive system-wide study of the physiological effects of alternative shift rotation practices. This study should complement the experience derived from exploration by the facilities.

- f. The FAA evaluate promptly by field visits, the nature and quality of annual medical examinations now being provided for all controllers, and act promptly to bring about such improvements in these examinations as will provide both the controller and the FAA the health protection that is sought.
2. To reduce the anxiety of the controller and to increase the efficiency of operations attributable to existing working conditions, the Committee recommends that the FAA:
- a. Replace and modernize existing operational equipment more rapidly than present plans provide for, and add workable radar and communication equipment (including back-up equipment) where needed. The Committee recognizes that the lack of funds has caused much of the present inadequacy of available equipment. But the need is urgent, and it is obligatory that FAA officials make known to the relevant executive and legislative authorities the essentiality of making extensive improvements during the current and ensuing fiscal years.

- b. Accelerate the improvement of the appearance, lighting, noise levels and other aspects of the physical environments now prevailing within many older terminals and flight service stations.
- c. Undertake promptly an extensive re-evaluation of how existing equipment impedes or handicaps the controller in the performance of the manual, visual, oral and other actions he must take in the performance of his task.* In addition, we urge that the FAA establish and adhere to a policy that equipment will not be relocated or installed without specific examination of the possibilities of bettering the man-machine relationship as a consequence of the relocation or installation.

In effecting the improvements in working conditions proposed by the foregoing recommendations, we regard it as important that controllers' views be sought and evaluated with respect to each aspect of the working conditions in the facility - work assignments, physical attributes and equipment. The ways in which the controllers' views are obtained should be worked out in consultation with representatives of employee organizations where such organizations exist.

Selection

The controller's career commences with his selection for employment by the FAA. In that employment decision the individual has a large stake. On it rests his future well-being and that of his family, his prospect for advancement, and the contentment he will draw from a working lifetime.

For the FAA, selection is of critical importance. In a system

* The "Engineered Position and Lay-Out Analysis at Chicago O'Hare Terminal" (October 1968) made by the Office of Management Systems, FAA, illustrates the kind of re-evaluation effort that is proposed.

in which the human being is central to its total effectiveness, selection failures represent dollars wasted in acquiring and training individuals who know too little about the career to make an informed decision, or are in various ways, unsuited to the work. Those failures are reflected in individuals who are "washed out" or who quit during their early training or first year's work experience.

The Selection Process

Air traffic controllers are selected by FAA from registers of candidates established by Interagency Boards of the U.S. Civil Service Commission. Applicants who do not qualify, by virtue of prior experience, for positions at the GS-9 level or higher, must take a written test. This test requires about 2-1/2 hours and is designed to measure five capabilities: arithmetic computation, non-verbal abstract reasoning, air traffic problems, spatial visualization in three dimensions, and the capacity to follow oral directions.

In addition to passing this written test with a required score of 210 (out of a possible 300) or more, the individual must give proof of meeting a general experience requirement of three years, either in work or in education beyond high school. Applicants with sufficient previous experience in the control of air traffic, as a pilot or in air navigation (usually in the military) or in certified dispatch work for an air carrier, do not take the written examination but have their experience evaluated by a panel of experts who weight the various types of experience proffered.

Those who pass this examination are placed on a register and then can be "certified" by the CSC upon request from the FAA. Persons drawn from these registers are interviewed by line managers at a nearby FAA facility.

A personal attributes test [Cattell 16 Personality Factor (PF)] is administered to those certified as otherwise acceptable.

Those completing the interview successfully are scheduled for

a medical examination in or near their home towns. If the 16 PF results indicate significant mental or emotional problems, a psychiatric examination is also scheduled. A candidate may be non-selected on the basis of medical findings.

There is substantial evidence that passing these selection processes - Civil Service qualification, aptitude tests, personal interviews by controllers, physical and psychiatric examinations - taken together are not effective in selecting an extensive pool of individuals possessing the talents required by the job cited above and the requisite "staying power". The ineffectiveness of these processes is suggested by:

- The high attrition experienced among new recruits. The extent of this attrition has been depicted in the section on Manning, pp. 12-22.
- Presence in the work force of a substantial but indeterminate number of individuals regarded by their peers and their supervisors as marginal performers. Although the testimony of peers and supervisors is unvalidated evidence, the prevalence of this view prompts further doubt as to the efficacy of existing selection processes.

Deficiencies in the Selection Process

Four deficiencies in the selection processes are clear:

1. They fail to attract an extensive pool of applicants and to inform adequately those who are attracted. Copies of the recruiting bulletins are mailed broadside for posting in first class post offices, college and university placement offices, employment service offices, and the like. On occasion, FAA regions will make positive efforts to attract candidates by personal visits to schools or organizations whose membership appears to have potential for recruiting. Except for the Central Region, however, this practice is sketchy and unsystematic; by and large the Civil Service Commission mailing of recruiting

bulletins is the principal manner of acquainting the public with the need for air traffic controllers.

The failure to attract recruits extensively is evidenced by the very large dependence on individuals with previous military air traffic experience for the Air Traffic Service. Those with relevant military experience constitute an especially fruitful supply but the large dependence on this source, in the face of a prospective need for expanding the work force by up to 40% by the end of FY 71, will become a significant problem, if not changed. Similarly, the processes that have been utilized have not succeeded in locating members of minority groups and interesting them in applying for positions in the air traffic control service. (As of June 30, 1969, the FAA estimated that approximately 250 Negroes were included in the ATC work force of 21,000.)

In addition, existing processes fail to portray adequately the working conditions and environment in which the jobs are performed, or the rigorous qualifications required for successful performance. Nor do they inform applicants of the high standards maintained in the training program and the substantial prospect of failure the individual faces. These conditions limit the ability of the individual to assess his own potential for air traffic control work or his willingness to "stick it out".

2. They fail to differentiate between and select for distinguishable work assignments. Analysis of the activities performed in the various facilities indicates that the work involved in centers, terminals and stations is clearly distinguishable. The capabilities required in each type of work differ in kind as well as degree. These differences are reflected in the existence of the center, terminal or flight service station "options" the

applicant may choose after recruitment. But existing selection processes do little to evaluate the individual's capabilities in relation to the requirements of his anticipated work assignment, or, subsequently, to assign him to that option for which he is most suited.

3. There is basis for considerable doubt that some experience now given special weight in qualifying individuals for selection does indeed forecast the individual's success on the job to which he is subsequently assigned. More than 60% of all individuals hired at selected facilities during the nine month period, January 1 to September 30, 1969, had previous military experience. That experience is usually in air traffic control or as a pilot. The former work experience, since it is limited to experience in military air terminals, has not proven to be a reliable index of the individual's success when he is assigned to a center; yet more than half the individuals assigned to centers during this period had such experience. The latter experience, e.g., as a pilot, has proven a much less reliable indicator of success as a controller in general.
4. The means used to measure the applicant's possession of talents and aptitudes required for success as a controller are of limited utility. These means are a) a written test, b) the personal interview, and c) the personality assessment.
 - a. The Written Test - The talents and aptitudes that the written test attempts to measure are suggested by the five parts of this test previously mentioned. No test yet devised can be expected to measure with exactness these talents and aptitudes, or others which might be contributory to success in the several jobs involved in air traffic control function. But the existing tests do not attempt to measure auditory and visual perception,

short-term memory, voice communication skills, capacity for integrating information quickly and acting upon it, penchant for risk taking, and capacity for teamwork - significant variables that appear to be associated with successful job performance.

Nor does the current approach to selection serve to eliminate older applicants. Experience with the tests, in training, and on the job makes clear that the older the applicant when recruited, the less likely he is to succeed in training and subsequently on the job in a terminal or a center. Moreover, staff analyses of data collected for 1965-1967 indicate that at least in centers, systems errors (incidents which involve less than adequate separation of aircraft) increase sharply among older controllers. While the data do show a negative correlation between success on the tests and the age of the applicants who take the test, the fact that many older applicants qualify on the basis of experience without taking the test means that the test as now used is not an effective tool for eliminating that proportion of older applicants who are least likely to succeed.

Despite clear evidence that increased age reduces the prospect for an individual's success as a controller:

- Approximately 40% of those listed as eligible for appointment on Civil Service registers are over 30 years of age; (see the following table).

Age distribution of eligibles on six Interagency Board Registers (GS-5-9) - as revealed by analyses of random samples by the Civil Service Commission in November and December, 1969.

Location of Interagency Board	Size of Sample	Proportion of Eligibles		
		30 and under	Over 30	Over 35
Washington, D.C.	145	60%	40%	23%
New York	150	61	39	22
Denver	150	52	48	36
Kansas City	532	62	38	27
Los Angeles	1193	61	39	26
Chicago	180	48	52	33

- Of all hires made during the period January 1 - September 30, 1969, at selected facilities a similar proportion were over 30 years of age; specifically:

<u>Number Appointed</u>	<u>% of Total</u>	<u>were in these age groups</u>
602	62	30 and under
222	23	31-35
92	10	36-40
52	5	Over 40.

- b. The Personal Interviews - of applicants by line managers - are subject to a high degree of variability and appear to contribute little to the identification and evaluation of needed talents and aptitudes. Interviewers are being asked to form judgments in areas in which they have little training or experience and they are provided with few guidelines and little counsel by the agency.*

* The FAA is currently exploring with its regional offices a series of proposals for strengthening the interview and orientation processes.

- c. Personal Attributes Assessment - The personal interview is supplemented by the use of the Cattell 16 PF inventory to assess personal traits such as emotional stability. This tool contributes only limited knowledge to the selection decision but does serve to identify the approximate one percent of all applicants whose "profiles" disclose problems warranting psychiatric evaluation. Of that small number requested to undergo psychiatric evaluation, about half are found acceptable for service.

Lack of Measures of Performance

Performance on the job, in the last analysis, is the final and best measure of the effectiveness of selection processes. The ultimate purpose of selection processes is to identify those individuals who, after requisite training and experience, will operate efficiently as a controller during times of stress, will function well as a member of a team and will continue in service at a high level of efficiency until retirement.

Unfortunately, FAA has not devised reliable objective measures of the proficiency of a controller. Only subjective judgments by peers and supervisors can be had, and these by varying standards. Such judgments, as has been noted earlier, hold that a substantial proportion (perhaps 10-20 percent) of those now serving as controllers (or as developmental controllers) are unable to perform satisfactorily. The traditional supervisors' ratings of employee performance place most employees at the high end of the distribution. In the absence of objective, relevant measures of individual performance, it is not only impossible to judge the worth of present selection methods, it is equally impossible to know what improvements are required.

More objective and standardized ways of measuring the controller's skill are being experimented with at NAFEC. As yet their application has been limited because of the lack of resources. Until more

reliable measures of performance are developed and refined, however, the agency will continue to depend for guidance as to the improvement of selection processes, as well as to the improvement of assignment and promotion practices, on crude trial and error methods.

Recommendations

There is a large cost to FAA in the loss, during training and early service, of individuals lacking the needed talents or inclination to control air traffic. Furthermore, there is the cost to the individual who finds himself "locked in" a career for which he is ill-suited. These costs argue loudly for expanding substantially FAA efforts to refine and improve the process of selecting those relatively few individuals in the national labor force who possess the particular talents, aptitudes and traits required for success as a controller.

1. To attract and better inform potential applicants for positions in the Air Traffic Service, the Committee recommends that:
 - a. The Civil Service Commission be asked to revise the hiring bulletin by which it attracts individuals to apply for positions in the Air Traffic Service so as to reflect more fully and clearly the nature of controller jobs, the training the individual undergoes in qualifying for journeyman positions, the working conditions the controller experiences, as well as the talents, aptitudes and traits required to succeed in this profession.
 - b. FAA develop and implement a program for orienting applicants referred for selection, to be held at air traffic control facilities. This program would enable the individuals to test their own interest and commitment in the light of a first-hand exposure to the work situation, and would enable the FAA to subject the applicant to additional and pragmatic testing. Such a program would add to the cost of recruitment; that cost should be offset, however, by lessened turnover

among the applicants who are employed. Experimentation with such a program over a two to three year period would be well warranted.

2. To provide the basis for improvement and refinement of selection processes we recommend that the FAA:
 - a. Initiate immediately an intensive analysis of the tasks involved in each of the several air traffic controller assignments* (e.g. flight service station, center and terminal options) to determine more fully what talents, aptitudes and traits (and in what degrees) are required for success in each assignment.
3. To refine the tools used for the selection of individuals to be hired from among all applicants, we recommend that FAA:
 - a. Reconstruct or refine the written test, in the light of analysis of the tasks that make up each of such jobs. Expand the written test, as the analysis of tasks may indicate is needed, to include measures of additional talents, aptitudes and personality traits and modify the methods used in scoring and weighting applicants' performance on these revised tests.

In the course of such reconstruction and refinement the inquiries of our staff suggest it will likely be found profitable to experiment with:

- "Movie" tests in which "real life" air traffic control situations are projected on a screen and applicants are asked to note on a prescribed answer sheet their predictions or their decisions as to action to be taken;

* A similar analysis was included in the "Design for the National Airspace System Utilization System (June, 1962)" pp. 168-176, as a basis for the design of equipment to capitalize on human capabilities.

- "Biographical information blanks" as a device that may contribute to the prediction of personal-social characteristics of the applicant's performance in anticipated job situations. Such paper-and-pencil inventories measure personality traits by inquiring about activities and interests rather than by the use of more sensitive questions traditionally used in personality inventory instruments.
- b. Redefine, in collaboration with the Office of the Secretary and the Civil Service Commission, experience deemed qualifying for employment in the Air Traffic Service. Such redefinition should involve the
 - Elimination of credit for experience proven to be little related to success as a controller (e.g. as a pilot),
 - Possible allowance of credit for other types of experience that can be shown to be related to the tasks involved in air traffic control (e.g., jobs requiring communications skills, railroad dispatcher),
 - Introduction of a requirement that all individuals granted credit for experience as air traffic controllers submit to the written test as a means of further appraising that experience, and the building up of an additional body of knowledge as to the efficacy of the test in predicting success.

The Committee believes that the requirement for a written test of all applicants will significantly screen out a larger body of potentially less successful older applicants.

If this proves not to be the case, we recommend that the OST/FAA propose that the Congress enact legislation authorizing the FAA to limit its recruitment for control positions in

terminals and centers to individuals 30 years of age and under.

- c. Appraise present practices at the FAA Academy which result in the "wash out" of a substantial proportion of all recruits, especially in the en route option, within 120 days of their employment. There is considerable question as to whether this wash-out rate is due to the selection of poorly qualified trainees or to poor training which results in a high rate of failure. Until both selection and training procedures are improved, the Committee recommends that the Academy provide the trainee with additional coaching as is needed to compensate for possible weaknesses in the training program and ensure as large a number of successful controllers as possible.
 - d. Improve the interview process so that it may contribute more meaningfully to the selection of air traffic controllers. Specifically, have applicants interviewed by a team composed of a line controller (trained as an interviewer) and a trained personnel interviewer capable of inquiring into and evaluating the applicant's work experience and assessing personality traits. In addition, provide further training and guidance for those controllers asked to participate in such interviews.
 - e. Re-appraise all selection processes to assure that they seek out and do not in fact discriminate against minority group members who can be developed to be fully effective controllers. In addition, it will be important to ensure that the tests being used for selection do not disadvantage those members of minority groups who are handicapped by prior environmental or educational deprivation.
4. To provide a more reliable basis for the selection of future controllers (as well as for more effective and equitable

assignment and promotion and more efficient management of the existing work force), we recommend that the Air Traffic Service

- a. Develop systematic and objective means for the evaluation of the proficiency of controllers on the job. Among the more promising means is the NAFEC dynamic simulator. Recent research has demonstrated the feasibility of testing job proficiency for the radar controller with a considerable degree of realism and under a variety of conditions.

Obviously the cost of bringing all controller personnel to NAFEC (Atlantic City) for test administration may be prohibitive. The possibility of administering such simulation tests at a number of geographical points through the use of existing computer capability deserves prompt exploration. Similarly, other testing techniques, e.g., the use of movies to simulate actual experience, should be investigated.

Controller Training

As in the process of controller selection, so in the processes by which FAA develops controller capabilities, both the individual and the agency have a substantial stake. For the individual, the efficacy of these developmental processes has a major influence over the extent to which he develops his full capabilities. For the FAA the efficacy of these processes directly affects the efficiency and the cost of operating the system that is designed to ensure the safe and efficient movement of air vehicles in the nation's air space. This system is a "labor intensive" system, i.e., one in which dependence is placed primarily upon human effort rather than capital equipment, and in such a system the development of that central resource - the human work force - is of prime consequence.

Cost of Past Neglect

At this point in time - January, 1970 - the staff development

task within the Air Traffic Service is complicated by:

- The shortage of qualified staff on hand in the facilities - as a consequence of the failure to recruit staff during the fiscal years 1962-67 -
- The failure in previous years to recognize the need for the various types of training that would simultaneously enable the individual to achieve his full potential rapidly and the agency to obtain the maximum possible utilization of each.

The results of those neglects are twofold:

- The efforts made since late 1968 to bring the staffing of each facility up to the levels believed necessary to operate each safely and efficiently have deluged these facilities with almost 5,000* "developmental controllers". These employees are now assigned to operating facilities to be trained by the facility training staff and by journeymen controllers who must simultaneously bear the responsibility of controlling air traffic.
- The accession, within FY 1970, of the anticipated number additional controller recruits promises to swamp the training capability of the Academy, and subsequently to add to the burdens that must be borne by the journeymen controllers in the facilities.

Present Program

In October 1968, with this expanded recruitment in prospect, the FAA reinstituted substantially the same over-all training program - entry training at the FAA Academy and controller training conducted at several hundred facilities - that had been conducted prior to its

* As of December 31, 1969, there were 867 developmentals in terminals, 3,466 in centers, and 410 in stations.

abandonment in 1962. This total program can be summarily depicted as follows:

For assignment to:	At the FAA Academy	At the Facilities -		
	<u>Initial Training</u>	<u>Area Rating*</u>	<u>Controller Training</u>	
			Non-Radar	Radar
Centers	9 weeks of classroom and laboratory exercises provided for all new recruits	Approximately 6 weeks of training, then work flight data duties from 6 to 9 months	Approximately 10 weeks classroom and laboratory then OJT checkout to work 2 sectors	Several days of classroom training and OJT during low traffic time periods - now being replaced by 3-week Academy course.
Terminals	9 weeks of classroom and laboratory exercises provided for all new recruits except those hired at GS-9.	Length varies	Length varies. Some classroom work but consists principally of on-the-job, in tower cab on positions of operation.	Consists exclusively of OJT provided under the guidance of working journeyman controllers. Variable in time length.
Stations	14 weeks of classroom and laboratory exercises provided for all new recruits		On the job training until journeyman grade reached.	

- * The term "Area Rating" covers certification of knowledge of the geographical area and of the "letters of agreement" with adjacent centers.

Entry Training - The FAA Academy is now the locus of the entry training of new recruits without previous relevant experience.*

The Academy's normal annual capacity of training is:

1,520 individuals for assignment to en route centers,

1,360 for assignment to terminals, and

600 to flight service stations.

To handle the additional number to be recruited during FY 1970, (over 4,000) an evening and midnight shift must be established and additional journeymen must be drawn from the facilities (where they are urgently needed) to serve as instructors at the Academy. The instructional staff at the Academy argues that there is a substantial loss in acquiring new skills at night in a training course as opposed to exercising skills on the night shift in a work situation.

The program offered by the Academy includes 2-3 weeks of training in basic aviation material dealing with weather, navigation and other materials required to equip the individual to pass the "airman's certification test".** (This is required even if the trainee has passed the test prior to being employed by FAA.) This material is intermingled with 3-4 weeks of training in flight data handling to prepare the individual for the tasks he will be assigned when first assigned to a facility. Finally, the trainee is given several weeks of control procedures training.

The content of the training now being provided for new recruits was substantially restructured during 1969. A principal modification is that there are now three separate courses, one for each option - center, terminal, station - and the training in each focuses on the needs that will confront the individual in his work assignment. But

* About 1/4 of those hired to work in the terminals at grade GS-9, because they have had previous military tower experience, by-pass the Academy course.

** A test required by the FAA Act for tower controllers covering basic aviation subjects - test items also are given to other options.

in this restructuring, the Academy relied wholly on its "in-house" staff composed of experienced controllers; it did not seek the advice of educators skilled in curriculum design or educational method.

The need for further analysis of both content and method is suggested by:

- The present practice with respect to the training of personnel with prior military air traffic experience in subject matter (e.g., weather and the description of navigational aids) with which they are already familiar, and
- The failure and loss of a high proportion of those assigned to the Academy for training. Overall, since classes resumed in 1968, slightly more than 20% of en route trainees have "washed out" by the end of the Academy assignment. Recently the rate has risen to as high as 30%. Lower rates of attrition, i.e. 11% and 5% have been experienced among trainees for the terminals and stations.

This attrition decreases the delivery of trained personnel urgently needed in the facilities, wastes scarce resources at the Academy, and constitutes an annual cost to the government estimated at about \$3 million a year. Yet there has been no apparent effort to determine the causes of this attrition (e.g., ineffective selection of recruits, irrelevance of content of or poor approach to training, etc.) or of the causes of subsequent attrition during the first year's service in a facility.

- The fact that much of the Academy training is not being utilized until the end of the employee's first year by which time he has forgotten a good deal. In the centers all of the procedures of the non-radar control taught at the Academy are re-taught at some point in the trainee's development at the facility.

Training at the Facilities - Roughly 60% of the training an individual is given to equip him to serve as a journeyman en route radar controller is provided at an operational facility. The Committee noted a number of problems in connection with the current approach to training at facilities.

The six to eight controllers who are generally assigned on an ad hoc basis to serve as instructors in each center, do not bring to this task, in most instances, previous experience in teaching. Their performance as instructors suffers because of the lack of training in teaching methods, the lack of a planned curriculum and instructional aids, and because some are assigned to the task against their will.*

In addition, although the center has been the locus for training in radar control procedures, no radar simulation capability is available at centers. Space for training is limited in the centers (generally two classrooms and one laboratory) and completely lacking in some of the terminals.

Center courses, which are not standardized, consist of approximately ten weeks of classroom and laboratory training. These initial courses concentrate on the teaching of non-radar (manual) control procedures, even though such procedures are infrequently used operationally. The ability to separate aircraft without radar in the event of radar failure is a necessary, back-up skill, but the concentration on such training limits the emphasis on vital training in radar control - the normal work environment the developmental employee is supporting. In addition, the variability in training provided by the individual facilities inhibits mobility and stimulates criticism

* Lack of desire to serve as an instructor is possibly attributable in principal part to the loss of premium pay for work on night shifts and overtime pay - an interesting anomaly given controller complaints about having to work overtime.

from controllers who compare what is done by the various facilities. There is no apparent effort being made anywhere in FAA to evaluate and ensure the adequacy of the training offered in each facility.

The training of a controller to the journeyman level is scheduled to take approximately thirty-six months. There is evidence and opinion that the time required for training could be shortened. The practical deterrent to the more rapid development of journeymen controllers, however, is the "Whitten Amendment"* which effectively limits the promotion of individuals to one grade each year. The time span for training is also attributed to the individual's need for "seasoning". The present compensation levels for journeymen were justified to the CSC in part, on the basis of the lengthy training and experience required. In view of the twin need a) for more controllers, and b) to reduce the burden of training on those who are now controllers, the length of the training period constitutes a major obstacle to the solution of staffing problems.

Training in Radar Control - Organized instruction in radar control is undertaken late in the developmental controller's career - some 2 to 3 years after entry to the occupation. Such training is provided either by formal instruction at a facility or by a three-week course at the Academy. By the time such training is provided, the controller has acquired some familiarity with radar as a member of the operational team on a sector in the center.

An early need is to help the developing controller "get the whole picture" in order to comprehend the entire control process. This need argues for the presentation of radar training sooner in the controller's career. After such training he will function more understandingly as a member of the sector team, his "seasoning" will commence, and his versatility can be developed.

* Sect. 1310, Supplemental Appropriation Act 1952 as amended. November 1, 1951. Public Law 82-253.

The lack of provision for training that confronts the individual with simulated situations on radar limits the effectiveness of training, and particularly of the conditioning of future controllers to the stress they will experience. The simulation of the actual air traffic control environment may be costly but is urgently needed.

Unmet Training Needs

In addition to the problems in the existing training program described above, three types of training required by controllers are unmet or unrecognized in the existing training program. These would enable each to develop his capabilities to the fullest, to maximize productivity, and to limit the threat of insecurity.

Proficiency Training for Journeymen - All controllers are required to meet qualification requirements and semi-annual proficiency checks. A continuing program of training to enable the journeyman to maintain his proficiency is, however, substantially lacking. The lack is primarily attributable to the inadequacy of available staffs in the facilities, and hence, the lack of trainor time for such training.

The absence of such training is aggravated by the lack of standards as to what "proficiency" is. Employees who transfer must meet the non-standardized "check-out requirements" at the facility to which transferred. Controllers transferring from low to high density facilities must be trained to handle more complex traffic. The wide variability in allowed performance standards and the lack of a systematic training proficiency program means that qualifying a transferred journeyman in another facility requires a prolonged period. This, when added to the time required to learn the terrain, means that up to one year may be required to qualify a newly transferred journeyman.

Training for Management Posts - The positions of crew chief, watch supervisor, facility chief, and some staff, support and

management positions in facilities, area, regional and headquarters offices, are assignments traditionally filled by individuals who have served as controllers. They are positions to which controllers may aspire.

Men who occupy these posts in the Air Traffic Service are called upon to interpret and enforce control procedures, to assign individuals among shifts, to schedule time on successive control positions, to present needed changes to higher management, to rate proficiency of trainees and controllers, to schedule overtime, and to resolve grievances. These tasks illustrate the substantial need of individuals occupying these posts to possess a variety of supervisory and coordinative skills. They must be capable of understanding and conditioning the attitudes of employees, of effectively communicating with employees and of relating the several elements of the supervisory process.

Courses in supervisory and managerial methods have been provided by the agency in the past for all supervisors and managers. These courses generally were of one week duration and taught the principles of supervision. Each class was composed of supervisors drawn from various functional activities of FAA and the Air Traffic Service; some specialized courses have been given exclusively for supervisors from the Air Traffic Service. However, all training in supervision and management including training in executive skills was abandoned during fiscal years 1968 and 1969, largely because of budgetary limitations.

No planned program or opportunities exist for prospective supervisors except for a correspondence course on supervision made available primarily for present supervisors.

Recommendations

If the Air Traffic Service is to maintain the productive, skilled, and harmonious work force that is required, more resources must be invested in the staff training needs of the FAA.

1. To revitalize and strengthen this work force we recommend the introduction of a new, multi-phased series of classroom and on-the-job training activities.* This would include:

- a. For New Recruits to be assigned to en route centers:

Phase I: An initial work training assignment - probably 3-5 weeks - to be conducted at one or more centers in each region designated and equipped to serve as training facilities. This initial training would be designed to:

- Provide real-life orientation for trainees. The individual should be assigned to a crew, rotated on the watch schedule, and thus made familiar with the control room environment.
- Validate the selection of recruits and their interest in the job.
- Provide the new recruit with the skills needed to perform flight data handling duties.

We propose that the individual be provided programmed instructional material** which would enable him to adapt the training to his own prior experience.

After completing this 3-5 week training program the trainee would be assigned, as now, to flight data work, for 6 to 8 months prior to undertaking the next phase of training. As the automation of the operations in the centers progresses, however, re-appraisals should occur as to whether this training/work period should be shortened.

Phase II of this early training for new recruits to be assigned to en route centers - probably 10-12 weeks -

* See Appendix XI.

** The Department of the Navy now has available units of programmed instruction on aviation weather and traffic control which have immediate usefulness.

would be provided at the FAA Academy following the work period. This phase would involve instruction and simulator work practice in all phases and aspects of air traffic control work, both radar and non-radar. The prime objective would be to equip the trainee to operate independently 2 to 4 low activity sectors utilizing non-radar control and utilizing radar control under supervision.

Having completed satisfactorily the training given in Phase I, academic classroom instruction of basic material in such subjects as basic aviation, weather and navigational aids would not be included in Phase II. Rather, to achieve the prime objective, more advanced simulation training devices and laboratory exercises in traffic control would be utilized.

Pending procurement of suitable types of advanced simulation devices, the agency must plan to use NAFEC's simulation capability, at least for the high density facilities.

- b. For New Recruits to be assigned to Terminals: The objectives of the revised program for new recruits for the terminals are substantially similar. To achieve these objectives it is proposed that:

- All recruits with previous military tower experience be assigned to training for the terminal option, up to the limit of that option's staffing authorization. Since all would have had the 15-week Air Force Air Traffic Control Course at Keesler AFB (or the Navy or Army equivalent), three gains would accrue: 1) no orientation to the job environment would be necessary, 2) the time lag in attaining journeyman proficiency

would be shortened, and 3) since they already have developed skills in traffic control, training could be shortened. The initial course at the Academy would be continued, but could be modified and shortened to accommodate the military experienced recruit.

- Following completion of this Academy course, intensified and better planned program of on-the-job training should be provided in designated "regional terminal training facilities" in each region. Essentially the proposal would reinstitute a plan in operation several years ago.

- c. For trainees to be assigned to flight service stations - no change in present training plans is proposed.

Coincident with establishment of this revised training program, OST/FAA should negotiate a new series of training and promotion agreements with the Civil Service Commission to provide authority for the more rapid promotion of individuals as their qualifications are accelerated. Such agreements will overcome the limitations currently imposed by the "Whitten Amendment".

- 2. To provide means for enabling journeymen controllers to improve and maintain their skills and thus to insure full proficiency, the Committee recommends that new proficiency training programs be established and that participation in them be required.

- a. National standards for proficiency evaluation need to be developed to supplant variable standards that now prevail among facilities, and more efficient, sophisticated training methods need be substituted for the present paper-and-pencil training processes to maintain the required level of

proficiency. Test exercises should be designed and consideration should be given to the use of advanced simulation trainers for giving standardized qualification and proficiency checks.

- b. A transition training program should be established for transferees among facilities which teaches sectors and traffic problems. Experience in training individuals for the New York Common IFR Room has indicated that a group of low-density controllers could learn, for example, several Chicago sectors (the flight patterns and geographical characteristics) in a 2-3 week course by using the NAPEC computer-simulator. Exercises confronting the individual with simulated operating conditions could season them to handle increasingly intense and complex traffic.
3. To develop urgently needed supervisory and other management skills that would heighten the effectiveness and improve the morale of the ATC work force, the Committee recommends that the FAA:
 - a. Identify those special aptitudes, talents, and personal characteristics that should guide the selection of facility supervisors. Undertake, on the basis of such criteria, a nation-wide program of systematically appraising the supervisory capabilities of all individuals who have served as journeymen controllers for three years or more.
 - b. Create an annual series of operationally oriented workshops to train existing crew chiefs and watch supervisors and others as they are identified (see above) in the peculiar problems encountered in the management of the air traffic controller work force, as well as in general supervisory principles. Particular attention should be given to how and when to intervene in the controller's handling of the

sector he has been assigned, how to plan the rotation of individuals among work positions, and implementation of alternative work assignment and scheduling practices as they are studied and developed.

- c. Provide training for all present chiefs and assistant chiefs of centers, towers, and stations to equip them better to communicate with employees and to handle management/employee organization relations.
4. To provide for a more comprehensive training effort, we recommend that the FAA:
- a. Seek resources to permit it to procure more sophisticated facilities for use in the proposed regional training facilities as well as at the Academy. Training must be as sophisticated as the system it serves, and simulation provides the sophistication as well as the only known process for learning a stressful occupation with low error consequence. Hence, we regard it as urgent that FAA acquire simulation capability to permit training on en route and terminal environments.
 - b. Divert the simulation capability at NAFEC from present functions to meet immediate and urgent training needs. NAFEC's system of target generation could be transmitted by leased lines to other locations. Manpower shortages are of sufficient urgency to warrant an especial effort to make this capability available.
 - c. Increase the professional capabilities of training staff at the Academy, at the facilities, and in the Office of Training Headquarters. If a substantially greater investment in the development of the ATC work force is to be made - as is needed - it will not be done effectively by a staff made up predominantly of individuals experienced in the

control of traffic but without prior training or experience in educational methods.

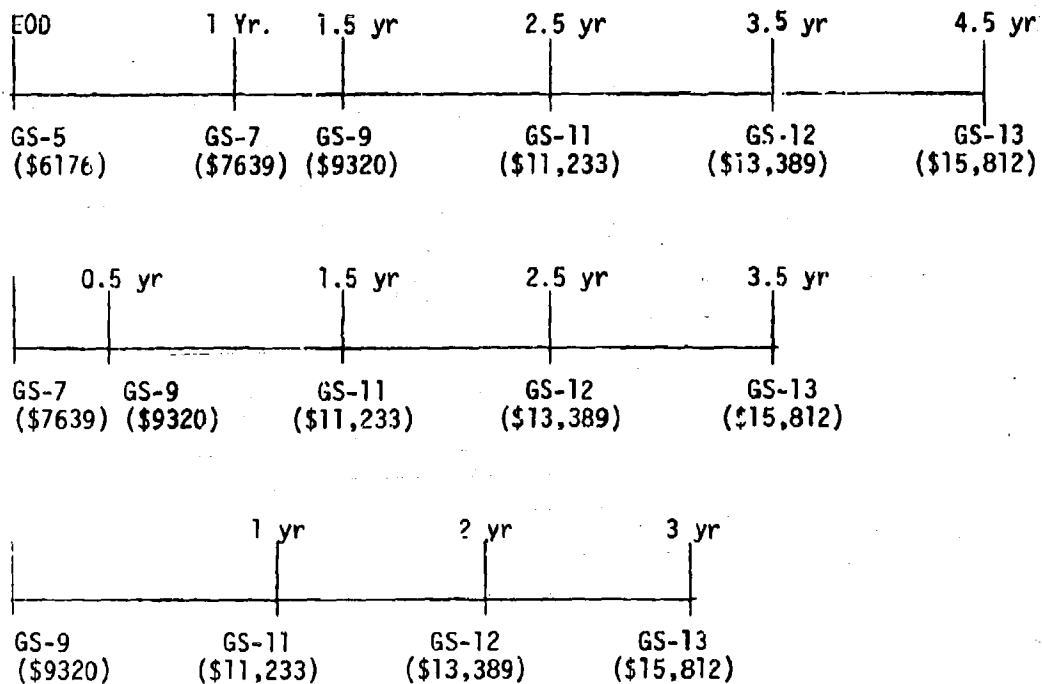
No other function within FAA of a professional character is staffed on the assumption that no professional training for its performance is required. Essential training cannot be performed economically or effectively on such an assumption. There is substantial need for an infusion of professional training skill in the design of curricula and the specification of teaching methods.

Compensating Controllers

Effective selection processes, well developed training, promotion, and assignment programs, considerate supervision, fringe benefits and eventually a secure provision for retirement are all essential elements to a satisfying career. But adequate and equitable compensation of individuals in relation to the work they are expected to perform is central to the individual's needs, and hence to the satisfaction he derives from his job.

To view clearly the compensation of controllers, it is necessary to picture first the approximate career compensation of an individual who is recruited into the Air Traffic Service.

Air Traffic Controller Income Progression



A further view of controllers' compensation is afforded by a statistical picture of the levels of compensation* of all individuals who made up the Air Traffic Service on September 30, 1969:

* Does not include night differential, Sunday and holiday premium pay and overtime.

Grade and Salary Range of:	Numbers of individuals, by location			
	Centers	Terminals	Stations	Hdqtrs. Regional & Area Offices
GS 16 \$25,044-31,724				5
15 \$21,589-28,069	30	72		89
14 \$18,531-24,093	701	566		276
13 \$15,812-20,555	2631	1211	52	270
12 \$13,399-17,403	1811	1920	258	185
11 \$11,233-14,599	694	2310	939	8
10 \$10,252-13,330	3	640	1451	19
9 \$ 9,320-12,119	1662	591	1300	2
8 \$ 8,449-10,987			9	
7 \$ 7,639- 9,934	809	196	156	1
Below \$ 3,889- 8,943	28	4	13	

Given the foregoing data, the Committee analyzed the following questions:

1. Are the compensation levels depicted adequate in terms of the relative responsibilities borne by controllers?
2. Is the compensation of individuals throughout the Service fixed equitably in relation to the responsibilities borne by one employee as contrasted with others?

Evaluating Adequacy

Basis for Present Compensation Levels - The grade levels for controllers were established by U.S. Civil Service Commission standards for Air Traffic Control positions (published in August 1968)*. In use, these standards are supplemented by other

* See Appendix XII for History of Air Traffic Control Standards.

Commission issuances.** Because the Commission standards rely heavily on the use of relatively abstract phrases such as "sustained periods of extremely heavy congestion", which might be interpreted differently by position classifiers in different parts of the country, FAA has issued its own interpretative supplement, "Organization and Classification Guidelines for Air Traffic Control, GS-2152-0", dated September 23, 1968. These Guidelines present quantitative indicators of facility volume to correspond to each of the journeymen grade levels in the Commission standards, and require that controller positions be classified in accord with CSC standards as interpreted by the FAA Guidelines. They also include instructions for classifying those supervisory, managerial and staff support positions not directly covered by the Commission standards.

Evaluation of Compensation Levels - Under the Federal Classification Act, compensation is based on grade levels established by Civil Service standards. In developing new standards in 1968, the CSC validated the standards for controllers by cross comparison with the classification grade levels for the following categories of jobs throughout the Federal service:

- Aircraft Operations Series GS-2181 (including pilots)
- Equipment Specialist Series GS-1670

** These include Supervisory Grade Evaluation Guide, and the Introduction to Position Classification Standards, which includes material on "Impact of the Man on the Job".

- Accountant Series GS-519
- Personnel Management Series GS-201
- Internal Revenue Officer Series GS-1169 (This series was selected as similar in having a two-grade apart professional-type grade structure, but not a strict professional educational requirement for entry.)
- Interpreter Series GS-1047. (This series was selected because of certain resemblances to air traffic controllers in memory and rapid action requirements, and the commitment responsibility once an oral translation was made.)
- Medical Officers, Medical Technologists, and Pharmacists (These series were selected because of the responsibility for human life involved, e.g., in the pharmacists providing the correct drug and dosage.)

The CSC also evaluated:

- The prior 1963 standard for GS-2152, giving due weight to occupational changes subsequent to that date.
- The Commission's internal-use evaluation tool, "Guide for Validating Non-supervisory Grade Levels in Position Classification Standards for Professional and Administrative Occupations."
- Entrance level requirements, progressions, and working levels.

The Committee reviewed the CSC study and concluded that controller grade levels were adequate when viewed in relation to

Federal positions of comparable responsibility.

The Committee's staff specialists made further comparative studies, devoting particular attention to the comparison of controllers' compensation levels with those prevailing for pilots, co-pilots, flight instructors and related staff specialists, navigators and flight engineers employed by the Federal government. These studies also led to the conclusion that the present level of controller compensation compares favorably with the compensation provided for these aviation associated positions.

Since by law Federal pay is to be maintained at levels comparable with analogous positions in private enterprise, the Committee's staff made such further comparisons with positions in private enterprise as would provide a further basis for evaluation.* These comparisons included analyses of the duties, responsibilities and pay of such positions as airline dispatcher, airline pilot, co-pilot and flight engineer. They reviewed the findings of a similar comparative study made of such positions in Great Britain. They have concluded that their inquiries further confirm the adequacy - in relation to the compensation of other similar positions - of the present levels of compensation of controllers. (See Appendix XIII.)

* One member of the Committee holds the view that such comparative studies provide no adequate basis for fixing the compensation of controllers.

Coincidentally, the Chairman of the U.S. Civil Service Commission in a letter to the Department of Transportation dated December 5, 1969, reiterated the CSC view that controllers' grades (and therefore compensation), are in line with the grades of other occupations in the Federal service and that they had no further review in mind.

Special Cost of Living Problems - Although the general levels of compensation for controllers were considered to be adequate, there is an acute problem of compensation for controllers working in high density facilities in the higher cost-of-living major metropolitan areas. Rapid living cost increases within recent years have aggravated this problem despite the increase in compensation granted controllers in these locations.

Together, the living costs and the intensity of the controllers' task in these facilities clearly inhibit the recruitment and retention of qualified air traffic controllers at the very locations where they are needed the most. Controllers outside of these locations are unwilling to transfer to these facilities because present compensation offers too little monetary incentive when higher living costs and other negative factors are taken into account.

The only authority which would facilitate the meeting of this problem is contained in Section 5303 of Title V, U.S. Code which allows the CSC to establish higher minimum rates for Classification Act positions whenever "pay rates in private enterprise for one or more occupations in one or more areas or locations are so substantially above the pay rates of statutory pay schedules as to handicap significantly the Government's recruitment or retention of well-qualified individuals."

In the instance where FAA used this authority at O'Hare Airport, Chicago, however, it was not successful in attracting controllers.

Moreover, there was strong discontent among FAA employees in other positions in the Chicago area whose compensation was not raised, and among employees in other high density, high cost-of-living facilities such as Los Angeles and New York.

Evaluating Equity Among Facilities and Among Individuals

Available evidence indicates that the grade levels prevailing for controllers are generally adequate in relation to the nature of the duties and responsibilities borne. However, our inquiries indicate that the criteria for rating facilities and hence establishing the grade level for individuals are in many cases inequitable.

Basis for Facility and Position Classification - The FAA Organization and Classification Guidelines essentially fix the compensation of the individual controller in relation to the volume of traffic handled by the facility to which the individual is assigned. (See Appendix XIV.)

Numerous examples have been presented to the Committee illustrating what controllers believe to be inequitable results of the application of these criteria for determining the grade levels of facilities. These examples point out that: 1) this method is based on an incomplete measure of facility complexity, and 2) workload of individuals is not adequately considered.

An Incomplete Measure of Facility Complexity - The existing practice of relating the compensation of controllers in a facility to the volume of traffic handled by that facility fails to take into account factors which add materially to the complexity of the controller's work in a particular facility. These factors include such elements as difficult terrain surrounding an airport, mixed traffic, multiple airports, tower en route control, complex airways, limitations on use of altitudes, types of working tools available, weather, variety of aircraft, airport layout, restricted areas, joint military and civil use operations, man-made obstructions, and the presence or lack of other near-by facilities.

The Committee's conversations in field facilities with controllers made patent that this is a general cause of discontent among controllers. Several facilities such as the Salt Lake City Terminal, sent in specific complaints, buttressed by facts and figures.

It is apparent that the present overly simplistic and mechanistic approach to determining levels of compensation make no provision for exceptional cases or for unusual circumstances affecting the complexity of the controller's task, as called for by the Civil Service Commission Standards. Good classification practice requires that the FAA develop a technique for carrying out the Commission's prescription that: "It is the total work situation of the terminal ... taking into account all of the elements ... that influences the grade level of individual positions." Such a technique can and should be devised.*

Failure to Consider Individual Workload Differences - In FAA practice, all journeyman controller positions at a facility are classified at the top grade established for the facility. This practice prevails despite the requirement of FAA "Guidelines" that: "There will be no automatic upgrading of positions based solely on the 'level' of facility. Each position must be examined individually by the facility chief" ... and he shall certify that .. "each position has been carefully examined to assure that the duties and responsibilities are commensurate with the grade level assigned and are being fully performed".

* The Canadian system of relating the compensation of controllers to the workload of a facility provides for the weighing of four separate factors: the volume and complexity of traffic, control procedures, physical characteristics and equipment complexity.

In practice, however it appears that once the grade level determination has been made for the facility, all journeyman controllers are more or less automatically assigned to that level. The assumption is made that over a cycle, because of rotation in positions, all journeymen will perform the same duties, and under substantially the same conditions. The fact is that this assumption is frequently not true.

The actual duties and responsibilities of individual controllers at a facility vary as a consequence of 1) sector groupings of unequal levels of difficulty, some of which may have traffic conditions significantly differing from the difficulty level typical of the facility as a whole; 2) individual differences in qualifications and performance characteristics, reflected in assignment patterns more or less difficult than those typical for the facilities; 3) substantial variations in staffing and number of journeymen available in a facility, affecting the incidence and duration of traffic saturation experienced by individual journeymen.

Illustrating this inequality 155 Denver controllers pointed out in a letter to the Secretary of Transportation dated November 21, 1969, "A recent FAA inspection team reported that specific sectors in the Denver Center have a greater workload responsibility than sectors in Chicago, Los Angeles or New York."

While that report does not support a conclusion that all journeyman controllers should be GS-13 in the Denver Center, as they are in the other facilities cited, it does indicate that there is a GS-13 level of difficulty in particular Denver sectors, and any Denver positions specializing in those sectors could be classified as GS-13.

Another example is the Houston Center, where the Civil Service Commission agreed early in 1969, that controllers in some sectors experience "sustained periods of extremely heavy traffic", i.e. the

characteristics requirement for GS-13. However, on the assumption that all 42 rotated in positions in various sectors, some of which had less heavy traffic, the Commission concluded that the "sustained periods" were diluted over the cycle, so that the average difficulty was only GS-12. If the appeal had been limited to six or eight Houston appellants, who specialized in the sectors of admitted GS-13 "busyness", it is probable that they would have been adjudged as warranting the higher level of compensation. Ironically within a month's time the traffic count for the entire Houston Center reached the "magic million" mark, and all journeymen positions were re-classified at the higher level.

As with performance of most tasks, individuals differ in the number of aircraft that they can control and the length of time they can occupy a busy position. Thus, good management logically matches the more effective controllers with the more difficult sectors and peak periods, and the less effective controllers with the less demanding positions and the less than peak periods. Finally, variations in the available journeymen in a particular facility can necessitate the consolidation of positions and sectors and consequently increase the demands upon particular controllers.

All such factors may result in some journeymen performing at levels above or below the expected performance of the typical journeyman at the facility, measured either in terms of volume of air traffic or of other factors reflecting complexity. Such superior performance could be distinguished by review of the individual's job responsibilities. (See Appendix XV, "Impact of the Man on the Job")

The immediate need is to give equitable compensation to the controller performing above the level of his peers. In cases where the prevailing grade is GS-11 or GS-12, the identification of the

individual who is required to perform at a superior level may permit the raising of his compensation to the GS-12 or GS-13 levels. For the busiest facilities, where the journeyman controller grade is at the top level authorized (GS-13), an alternative means should be found to increase the compensation of the individual performing at a superior level.

Inequities in Supervisory Levels - In 1966 FAA decided to abolish non-supervisory flow control and coordinator positions and to convert incumbents to supervisory crew chiefs. As a result, their compensation is that of a supervisor despite the fact that they are performing a very limited supervisory role. This is attributable to the fact that many incumbents were not capable of assuming supervisory roles, and that in some facilities more supervisors were created than were needed.* Proposed organizational changes involving a "team leader" and "area supervisor" concept may alleviate this problem. But equity dictates that crew chiefs who cannot be used in genuinely supervisory duties should be compensated at the same level as are other individuals performing on operating positions.

A similar inequity results in the largest facilities from the inflexible fixing of the grade level for the chief of the facility. Intermediate levels of supervisors are classified at lower grades than are warranted because the facility chiefs in high density facilities have not been authorized compensation at the level (GS-16) that is warranted by the responsibilities they carry. So long as the number of "supergrade" positions is illogically limited by present

* For example, in some centers there is approximately 1 supervisor to every 5 or 6 controllers (journeymen and developmental) while in other centers there is 1 supervisor to every 10-12 controllers; in the terminals, in areas of dense air traffic there are facilities with as many as 1 supervisor to every 4 or 3 controllers.

legislation, appropriate levels of compensation (i.e., GS-16) will be denied facility chiefs and the compression at subordinate levels will persist. This means that watch supervisors in the high density facilities will be compensated at the same level (GS-14) as are a number of crew chiefs that they supervise. They are also compensated at the same level as watch supervisors in less busy facilities where crew chiefs are compensated at a lower level (GS-13). Without the ability to offer any incentive in the form of a grade differential, the Air Traffic Service will find it continually difficult to fill such jobs with deserving individuals serving in less responsible positions graded at the same level.

Recommendations

The FAA is confronted with pragmatic compensation problems that must be resolved in an equitable manner.

1. To provide a level of compensation that will attract and hold controllers in those facilities located in certain high cost-of-living areas where air traffic volume is at a peak, we recommend that OST/FAA:
 - a. Formulate a proposal for higher compensation within the journeyman grade and aggressively seek authority from the Civil Service Commission in gaining authority to pay such compensation to controllers at such facilities at levels substantially above those now authorized. Presumably this can be achieved under authority of Section 5303. Pending the granting of such authority it is proposed that the FAA recognize the higher quality of performance required of controllers in these facilities by "high quality increases".
2. To overcome the widespread dissatisfaction that is caused by the present overly simplistic and mechanistic method of fixing the compensation levels of individuals serving in field facilities in relation to the volume of air traffic handled by each facility, it is proposed that FAA:

- a. Revise its GS 2152 Organization and Classification Guide to direct that elements such as unusual terrain, the airport runway configuration, or special traffic procedures that affect the complexity of directing traffic by any facility be taken into account along with the volume of air traffic, and that the categorization of facilities be reviewed to give weight to these elements. Provision should be made for use of air traffic controller specialist panels familiar with the subject matter in review of facility classification appeals in which exceptional complexity or volume elements, beyond those currently recognized, may be significant.
- b. Initiate promptly a study of these (and other) elements determining the complexity of the duties and responsibilities borne by individual controllers in at least the major facilities located in the twenty-two geographical "hubs" to determine methods for giving appropriate weight to such elements. In order to assure objective and fresh analysis of this problem, it may be desirable to contract with competent specialists from outside the government to conceive and develop the needed methods.
- c. Direct regional personnel offices to ensure recognition of individual position differences in the classification of positions in each facility. This will include recognition of the "impact of the man on the job" in those instances in each facility where some few individuals assume responsibilities over and above the normal job

requirements.*

2. To eliminate inequities that now prevail in the compensation of supervisors in the field facilities, it is proposed that the FAA:
 - Seek legislative authority to classify positions in the 2152 series at GS-16 or above without regard to the numerical limitation on "supergrades". Alternatively, seek authority to place all positions in FAA above GS-15 in an "excepted" status.
 Either of these alternatives would permit the establishment of pay levels for upper management and supervisory positions more in accord with the responsibilities borne by individuals who serve in these positions.

Career Progression

The successive steps in a controller's career - from his entry into the Air Traffic Service until eventual retirement - can, and should, simultaneously serve the best interests of the individual, and the Service. For the individual, successive assignments should represent opportunities for more responsible work, for the fuller development of his capabilities, and for increased earnings and broader experience. For the Service, these successive assignments should make available an increasingly productive employee at those posts within the national system where his talents are most needed.

Mechanics of Assignment

Two practices prevailing within the Air Traffic Service now limit the extent to which successive assignments serve the best interest of the individual and the Service. These practices are:

- Permitting the individual to identify with a facility or a region rather than with a nation-wide system, and
- the less-than-satisfactory system of transfers.

* If the existing regulations do not permit recognition of the assumption of such additional and continuing responsibilities by controllers classified at GS-13, we recommend that the FAA distinguish as a separable class such individuals and the approval of the CSC be requested for the higher compensation within GS-13 or in GS-14.

Assignment to Facilities - Under existing recruitment practices the individual who accepts employment in the Air Traffic Service agrees to accept assignments at any geographical location where he may be needed. Yet the Committee noted that not only was this agreement not being utilized, but that the assignment of controllers to facilities was not being carried out in such a manner as to benefit either the individual or the system.

- Individuals are not being assigned initially to low density facilities where they may gain "seasoning" prior to assignment to facilities where the work is more exacting.
- Recruits with military tower experience are being assigned to centers, where their experience is not useful.
- The age of the recruit does not appear to be a factor in assigning him to an option.
- A controller is recruited in the regions to meet the needs of individual centers, terminals and stations - not to meet nationally determined needs. Promotion decisions are made by local facility chiefs, subject to the review of Area Office officials. They appear to be primarily influenced by the staffing needs of the particular facility for which the controller was originally recruited.

In summary, current recruitment and promotion practices tend to "tie" the individual to the local facility. This tendency limits the variety of experiences the individual accumulates, and does not contribute to the placement of the individual where he may be most needed within the Air Traffic Service.

Transferring Within the System - FAA regulations* provide for the distribution of lists of vacant positions and the right of employees to indicate their desire that they be considered for

* FAA Directive 3300.1A Merit Promotion Program.

particular positions. This "Merit Promotion System" has recently been revised and was to become effective July 1, 1969; in several regions promulgation of the revised plan was delayed as late as November 1, 1969.

In concept, this new system provides broad opportunity for controllers to express their preference for promotional opportunities that become available. In practice it provides significantly less real opportunity.

The individual's opportunity is limited, first, by provisions of the plan which define a geographic "area of consideration" from within which applications (or "bids") will be accepted. This limits both the individual's range of opportunity and impedes the promotion of individuals outside of the area of consideration to the vacancies where their talents may be urgently needed.

The individual's opportunity is similarly limited by varying qualifying procedures from one facility to another. Prevailing practice requires that the individual who transfers from one facility to another must cope with an unstandardized "check-out" procedure. And it means that a large proportion of all vacancies at grades GS-12 and -13 are filled by individuals serving on the staff of the facility where the vacancy is located.

Thirdly, in addition to the lack of geographic mobility, there is an increasing tendency to limit the possibilities for advancement within the Air Traffic Service to the option to which the controller was initially assigned. For the individual this means narrowed opportunity; for the agency it means lessened flexibility in the use of its most valuable resource - talented manpower.

The handicapping consequence of these limitations on mobility is clearly seen in several high density facilities - particularly in the O'Hare and Kennedy terminals and the Aurora, Islip and Palmdale

centers. These and a few other high density facilities have suffered for an extended period from a scarcity of qualified personnel. Yet a succession of efforts to induce individuals to transfer to these facilities from smaller, better staffed facilities handling lesser volumes of traffic or from other options have been unsuccessful.

There are no adequate incentives to attract personnel to these higher density facilities. Rather several disincentives exist that have made it impossible to draw from the thousands of personnel that make up the Air Traffic Service the individuals urgently needed to fill vacancies existing in these facilities. These disincentives are:

- A widespread awareness of the intensity and complexity of the work of controllers in these facilities;
- The reputed high cost of living in many of these metropolitan areas; and
- The practice of preventing the individual from transferring out of these facilities once he has been assigned because his services are urgently needed there.

This last personnel practice is a cause of bitter resentment among controllers and an avowed deterrent to the voluntary transfer of individuals now assigned to other facilities.

Finally, an especially demoralizing result of the lack of mobility is exemplified by the older controller who, having worked his way up to the rank of a journeyman controller in one of the larger and critical facilities, reaches the point of "burn out". His productive working life might be materially extended, to the advantage of the Service, if he could be transferred to a facility handling a lesser volume of air traffic, promoted to a supervisory assignment, or assigned other work within FAA for which his experience is qualifying. At present, however, he is effectively denied the opportunity to transfer to an assignment at a smaller facility by

the management policy restricting such transfers or by the differences in pay levels in the smaller facilities. No positive and substantial effort is made to equip the controller for a supervisory post. Nor is there a positive program designed to assign him to other work within FAA.

The ideal promotional and assignment system for the ATS work force would be one that provided incentives that attracted the ablest individuals to serve in those high density facilities where the agency's need is greatest and the control task most complex. But there is currently no system for nation-wide coordination of recruitment and assignment practices. Trainees, after brief training periods at the Academy, progress to the journeyman level typically at the facility for which they were recruited. The revised Merit Promotion System which requires consideration of candidates applying from other facilities, will constitute a step forward if information on possible vacancies is made generally available, and if the System is rigorously enforced.

Recommendations

The more effective utilization of the air traffic control work force, in our opinion, requires action along five lines.

1. To ensure simultaneously the availability of the ablest individuals in those facilities where most needed and the fullest development of each individual, the Committee recommends that the FAA:
 - a. Formulate a career plan that will provide for recruitment in accordance with national needs, and subsequently, after the period of basic training recommended in this report, for
 - Initial assignment to a low or moderate density facility;
 - Upon successful completion of two or more years, assignment to a larger facility where the volume of work is greater and more complex.
 - After successful completion of three or more years' assignment

- in such a larger facility, assignment of those individuals adjudged to have demonstrated superior capabilities to the high density facilities, and
- Professional counseling to aid the individual in the high density facilities determine what career he should look forward to after ten or fifteen years as a controller (i.e., either as a supervisor in the ATS or in other capacities in FAA, or without the agency), and training (either within or without FAA) to enable the individual to prepare for that career.
- b. Utilize the various incentives it can offer in the form of grade promotions, within grade salary increases, educational and training opportunities, retirement arrangements or still other incentives to encourage the implementation of this career plan.
- c. Establish those administrative mechanisms that will ensure the carrying out of such a career plan; such administrative mechanisms should see to it that -
- The record of performance of each recruit is reviewed annually and prior to his second assignment;
 - A method and system of evaluating performance (as is recommended in the section on Selection) is established and gradually improved;
 - A deliberate effort to broaden the experience of each individual who demonstrates a superior level of performance is made by the rotation of such individuals between centers and towers, and from stations to towers and then to centers; and
 - The commitment to mobility throughout a national system is made a reality.
2. To make high density facility assignments as well as career progression more attractive, the Committee recommends that the FAA:

- a. As discussed elsewhere in the Report, require that, absent unusual circumstances, all staff and supervisory GS-2152 positions at the levels of GS-13 and above be filled by controllers who have served a minimum of five years at designated high density facilities.
- b. Modify current assignment practices to allow controllers who have spent a minimum of three years as a journeyman controller in a high density facility to "bid out" for lower grade positions if they choose to do so.
- c. Place no restriction on the freedom of controllers who have spent ten years or more in a high density facility to transfer laterally to less demanding positions.
3. To facilitate extending the work life of controllers who are unable to continue performing satisfactorily at high density facilities, the Committee recommends that the FAA:
 - a. Establish positions as "Senior Controller" in low density facilities to which individuals who have served as journeymen controllers for ten years or more in a high density location may be assigned without loss of grade or pay. These individuals can serve usefully as controllers and contribute to the "seasoning" of younger men of more narrow experience.
4. To build understanding of the intention of administering a truly national personnel system and to maximize the incentives available to controllers who demonstrate fully satisfactory and superior performance, the Committee recommends that the FAA:
 - a. Extend efforts already made to explain and promote greater understanding of the revised (and markedly improved) Merit Promotion System as it affects controllers, and solicit suggestions from employees as to how administration of the system may be further improved.
 - b. Utilize as fully as possible present authorities to make

cash awards in recognition of superior performance of individual controllers.

5. To develop a more fully competent supervisory force and better equipped managers for the ATS, we recommend that the FAA:
 - a. Identify from among all supervisory and administrative positions a number of key managerial "entry level" positions within the ATS.
 - b. Create a "ATS Managerial Training Corps" to be composed of employees selected in a national competition among those at one or two grade levels below the various managerial entry levels; e.g., at the assistant chief level in larger facilities or the chief level in smaller facilities. The initial size of this Corps and the annual additions thereto should be calculated on the basis of anticipated attrition in the selected managerial entry level positions.
 - c. Formulate a developmental program for each member of the Corps prior to initial managerial assignment.
 - d. Establish a firm policy that all appointments to the designated entry level position will be made from the Managerial Training Corps.
 - e. Ensure that individuals be made to understand, prior to selection, that the entry level position to which they could be appointed would typically be at other than their "home" facility, and that they would subsequently be subject to assignment anywhere in the system. As mentioned above, five years' service in high density facilities should be considered one of the pre-requisites to full development.
 - f. Gradually integrate all positions above the entry level into the system to the end that all key ATS management positions would eventually be filled by individuals who had progressed through the Corps.

Alternative Employment or Retirement

A major cause of dissatisfaction among the controller work force is the deepseated and widely held belief that most individuals will be physically unable to continue to control air traffic (even while physically able to perform other kinds of work) well before they will have qualified under prevailing provisions for retirement. This phenomenon, referred to as "burn out", is believed to affect controllers at ages ranging from as low as 40 up to 50 years of age. Few individuals intimately familiar with this profession challenge it.

Most controllers attribute this condition to frequent and/or prolonged periods of stress in day-to-day performance of their responsibilities. While the FAA, so heavily dependent upon the performance of the controller for its success, has given insufficient attention to the extent of this phenomenon and its impact on the individual, the effects of stress in varying degrees are supported by a limited number of physiological and psychological facts (see Appendices XVI, XVII). The conclusions derived from these facts are:

1. Proportionately, controller personnel report significantly more headaches, ulcers, chest pains and cases of indigestion than do non-controllers. As controller personnel progress through their careers, they report more stress-related symptoms than do non-controllers.
2. Certain objective measures such as heart rate and urinary hormones show definite evidence of significant stress response in a sample of controllers as compared with a control population.
3. The average age at which disability retirements are made is lower for air traffic controllers than for all other FAA personnel. For example, of those under age 50 retiring for disability, 54% are controllers, 45% are other; between the ages of 20 and 44, 67% are controllers while only 33% are other.*
4. Nervous and psychological reasons accounted for 38% of the

* Controllers approximate 45% of the total FAA work force.

controller disability retirements during FY 67-69, compared with only 20% for other FAA employees.

The "burn out" is also attributed to the lessening, with age, of those abilities essential to effective performance as a controller. Aging may tend to diminish the individual's capacity to perceive the relationship in space of a number of planes moving at varying speeds, to retain in his memory the identity, altitude and speed of each of the planes he has under control, to coordinate mental processes and physical actions rapidly, and to make prompt and balanced decisions. In fact, performance on controller simulation devices is revealed to be generally poorer for older controllers. The impact of age on needed talents and aptitudes, similarly has not been subjected by the agency to the thoroughgoing analysis it deserves, but professional opinion confirms the belief of men who work at this job that there comes a time when most individuals are unable confidently and safely to control traffic.

Finding Alternative Employment - Associated with the matter of disability retirements is the situation of the controller who, though not meeting the rather stringent requirements for medical retirement, becomes incapacitated to perform active controller duties. FAA Order 3300.16 (dated October 5, 1967) established a program designed to aid employees found medically disqualified for their present positions to find continued employment. Of approximately 320 air traffic control specialists released from their positions following the required annual medical examination since 1967, as of October 1969 -

- 194 had been retired as physically disabled,
- 7 had left the FAA by transfer, resignation or termination,
- 42 remained in a "pending status" i.e., in most instances these individuals were being "tried out" in another position, and
- 77 had been assigned to other positions of which approximately 90% were in work involving air traffic control skill or knowledge.

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- 77 had been assigned to other positions of which approximately 90% were in work involving air traffic control skill or knowledge.

There is no record of what has become of those controllers who have been removed from a control position because of inability "to keep up with the traffic" (rather than for explicit medical reasons) or who have themselves determined they can no longer continue controlling air traffic. The number of controllers reaching this point in their careers to date is markedly limited; there is little evidence, however, that FAA is developing plans to find alternative assignments for such individuals as their number increases.

At present (January 1, 1970) there are about 1,500 air traffic controllers age 45 and above in centers and terminals. In each of the next five years, FAA will probably be confronted with the demand that it aid as many as 100-200 of these controllers to find other employment. The Committee, therefore, has inquired as to the availability of other positions to which these individuals might be re-assigned at compensation levels equal or higher than they attained (i.e. GS-12 and GS-13) as controllers. Our inquiries suggest that the FAA could provide opportunities for continued employment in:

1. The non-operational (i.e. staff, support and management) positions in the Air Traffic Service. There is a total of 4,000 positions (Series GS-2152) at headquarters, regional and area offices, the FAA Academy, and in the stations, terminals and centers. This total number includes planning, data processing, and training positions in the facilities; positions in the area offices involving responsibility for administrative, personnel, budgeting, and supply matters; positions as instructors at the FAA Academy; and positions in units concerned with procedures and management in the regional and headquarters offices.
2. The Flight Standards (Aviation Safety) Service. Here it is estimated that about 500 positions could be filled by those air traffic controllers with previous pilot or flight instructor

experience* who can still meet the physical and medical standards; and,

3. Administrative positions (e.g., as management analysts, management technicians, personnel specialists and budget analysts). It is estimated that the number of such (non GS-2152) positions throughout the agency approximates 900**.

If it is assumed that turnover and expansion in these three areas of employment will approximate 6% of the total number of positions and that one half of these positions might be reserved for qualified controllers, a total of about 150 opportunities for the employment of controllers could be available each year.

The capabilities and interest of individuals who conclude their active service as controllers may dictate whether they search for other types of employment within the Federal service or in private enterprise. Within the Federal service it is conceivable that in such agencies as the Department of Defense, National Aeronautics and Space Administration, and the Federal Communications Commission some positions could be found for which controllers could qualify.

Outside the Federal service, opportunities could be developed in the air transportation industry in such positions as that of airline dispatcher, and as technical instructors in the increasing number of educational institutions giving aviation-related courses.

The FAA has made limited efforts to counsel controllers in selecting appropriate alternative employment or to find jobs for them in any of the foregoing areas of employment. It has accepted little responsibility for providing needed training or other

* Of 9,531 controllers who responded to the 1967 questionnaire survey, 3,785 or 40% had had experience as a pilot; 2,000 of this total had held commercial or air transport certificates.

** The same survey showed that 1,462 controllers reported they had had previous experience in personnel work, 1,769 in office management, and 544 in finance or accounting.

preparation for the substantial adjustment the controller will have to make. Such efforts as have been made have yielded small results which afford the present generation controllers little assurance of continuing employment when they can no longer control traffic.

Providing Early Retirement - As an alternative to the finding of continuing employment, the provision of "early retirement" has significant disadvantages as a means of meeting the problem of "burn out".

For the individual, retirement at a fraction of his prior earnings (perhaps 50% of his average earnings during the three years preceding the conclusion of his active service as a controller) means adjusting to support his family with a markedly reduced income. Furthermore, the opportunity to find other employment will be limited by the fact that his work experience as a controller is quite narrow and does not train him in a manner to qualify him for alternative opportunities.*

At the age of "burn out", the individual may be expected to have dependent children, and to have achieved a standard of living (with the attendant fixed mortgage, insurance and other costs) that necessitate a continuing income as great or approximately as great as that attained as a controller, i.e., ranging from \$14,000 to \$20,000. On the other hand he also looks forward to from 10 to 20 years of physical well-being without the prospect of maintaining a standard of living he "earned" through exacting and sometimes onerous work.

The controller who reaches the "burn out" point is typically "young" by conventional work and retirement standards. He has the capacity and many, at least, will have the desire to continue to

* A survey conducted by the Air Traffic Service in 1967 indicated that of 9,288 controllers who responded 4,920 had had a high school education or less, 2,293 had attended college for two years or less, 1,528 attended college for more than two years but did not graduate and 547 (approximately 6%) had graduated from college.

work and maximize their earnings. Moreover, and importantly, no provision now exists that would enable him to retire (in the conventional sense), if that were his choice.

This prospect - the lack of other alternative employment opportunities or an effective provision for retirement - is a major cause of the low morale that now pervades the ATC work force. It poses for the FAA an immediate need for ways of reducing or eliminating these bases of insecurity.

Recommendations

The Committee is convinced that the special demands of the air traffic controller occupation, in which only the young and alert are competent to control air traffic require the development of a special career system tailored especially to meet the needs of the controller work force. Such a special career system must provide for the relatively early removal from active control functions of those controllers who are incapable of performing at required levels of proficiency. To this end we recommend that the FAA take action along three lines;

1. Provide for exacting annual proficiency examinations for all controllers engaged in the active control of air traffic and for the prompt removal from air traffic control work of those unable to perform by acceptable standards. The need for such annual tests of the individual's proficiency in the performance of such a responsible function has previously been stated.
2. To aid all journeymen controllers to equip themselves for the probable need for alternative employment, when they can no longer effectively control air traffic, the Committee recommends that the FAA:
 - a. Establish a professional staff to develop likely sources of alternative employment and capable of counseling individuals

reaching forty years of age as to the opportunities within FAA, elsewhere in government, or outside, for which each might prepare himself.

- b. Provide, within facilities or at the Academy, training for this purpose, particularly that training which will equip individuals for reassignment to other positions within the agency.
- c. Where appropriate, aid individual controllers to obtain requisite education and training at colleges and training schools. Such aid will involve special consideration of the individual's shift assignment, and the reimbursement of expenditures for tuition. Ample precedent for the undertaking would seem to be found in the Government Employees Training Act. But if present legislation does not authorize the provision of such training, we urge that the OST/FAA seek requisite authority.
- d. Arrange with the Department of Defense to make available to the controllers the educational program of the U.S. Armed Forces Institute.
- e. Grant priority to controllers who have served five years or more in high density facilities in the filling of vacancies in non-operational positions in the Air Traffic Service, in relevant positions in the Flight Standards Service, and in administrative positions throughout FAA.
- f. Obtain such authority as will be needed from the Civil Service Commission or by legislation enacted by the Congress to permit the individual to retain both the grade and salary he has achieved as a controller when, after ten years' service in a high density facility, he is re-assigned to a position in a facility with less dense air traffic, or to other positions in the FAA. (See previous recommendation for position of "senior controller".)

- g. Assign responsibility to the Office of Personnel for the placement in suitable positions of all controllers who choose continued employment. This assignment should include responsibility for obtaining information and facilitating training and out-placement to jobs in Federal, state, and local governments, educational institutions, and private industry.
3. The FAA should provide for retirement income for those controllers who, when they are determined to be unable to continue to control air traffic safely, can no longer continue in active employment, or who choose to retire. This will require approval by Congress of amendments to the Civil Service Retirement Law to provide, in recognition of the unusually stressful character of the controller position, earlier retirement than that permitted other Civil Service employees. (This option would be available only in lieu of the second career training recommended.)

The Committee has studied a number of proposals presented in previous years to provide for the early retirement of controllers. (See Appendix XVII, FAA's Efforts to Obtain Early Retirement for Controllers.) The Committee will not attempt to prescribe the exact provisions of the amendments required to accomplish the objective that has been stated. It presents the two alternative plans that follow as illustrative of arrangements that will meet what it regards to be an essential need:

Plan A: - Amend the Civil Service Retirement law to provide accelerated credit, for retirement purposes, for journeyman level air traffic control specialist work in terminal and center facilities. Specifically provide that for each year of such work performed at a high density facility the individual shall be credited 1.4

years toward eligibility for retirement and in measuring the benefit he shall receive in retirement.* After acquiring 30 years' retirement credit, the individual upon application for retirement, would be entitled to an immediate annuity, regardless of age, and without reduction in annuity for years under age 55.

Plan B: - Amend the Civil Service Retirement law to authorize retirement of those individuals who have served as journeyman controllers for ten years or more in high density facilities a) after 25 years of ATC service, regardless of age, or b) at age 50 after 20 years of ATC service, with no reduction for retirement under age 55, and guarantee under the general annuity formula a basic annuity in such cases of 50% of the employee's high-three average salary.

The Committee further recommends that either the employee or management should have the option to initiate early controller retirement; regardless of which of the two plans is adopted. The basis for this option would be the proficiency tests to be developed and which should be given at least annually.

The Committee recognizes that if various factors in the controller career which contribute to the stressful nature of the occupation were corrected, the basis for early retirement might be eliminated. It therefore recommends that, regardless of which system may be sought, a time limit - perhaps five years - be placed on the effective period of the legislation. This would afford both the Congress and the FAA an opportunity to reappraise the need for a special retirement system for controllers.

Needed Information and Research

Time after time, in evaluating the various elements of the controller's career, this Committee has been confronted with the lack

* Hence, 20 creditable years of actual work experience in a high density facility equals 28 "accelerated years" for retirement purposes (20 x 1.4 = 28.0).

of pertinent and essential information on which to base major management and policy recommendations. For example:

- In the analysis of the selection process, information as to the extent and causes of attrition are lacking, and data indicating the necessary aptitudes of prospective appointees do not exist.
- Very limited analyses of the precise content of the controller's job exist, and little exploration of alternative educational technologies had been undertaken. Hence, the Committee's evaluation of the training needs has been inhibited.
- No adequate techniques have been developed and implemented to assess objectively the controller's proficiency.
- No data have been marshalled as a basis for formulating proposals to meet the need for greater compensation to attract individuals to serve in the facilities in major population centers where living costs are high and air traffic is dense;
- Research to determine the extent of stress and its physiological and psychological impact on the individual has been minimal.
- There is little evidence of analysis of the relation of machine structure and physical layout to the functioning of the controller on the job.

These and other difficulties noted in earlier sections dealing with working conditions, selection, training, career progression and retirement, are likely to continue, unless

- Adequate resources are directed into creating and maintaining a fuller body of information as to this work force and demands on it;
- More concentrated and imaginative analysis is devoted to adapting the equipment used by the controller to his functioning on the job and his physiological and psychological capabilities;

- Responsibility for research as to the work force, its environment and equipment is coordinated and centrally directed; specifically this means the fuller coordination of the activities of the Air Traffic Service, the Civil Aeromedical Institute, the Office of Aviation Medicine, the Office of Personnel, NAFEC, the Department of the Air Force, NASA and the Civil Service Commission.

EMPLOYEE/ MANAGEMENT RELATIONS

The crisis within the Air Traffic Service of the FAA will not be resolved only by a) the provision of more adequate staff, b) the improvement of working conditions, and c) the revision of institutional arrangements relative to the selection, training, compensation, promotion and assignment and retirement. Additional actions are required to overcome existing antipathies between many controllers and the hierarchy, from crew chief to the Administrator.

If the management of any enterprise is effective, it mobilizes the intellect and the zeal of its employees. The means by which management involves the full capabilities of its staff are several. They include at least a) an understanding as well as capable supervisory force; b) continual and efficient efforts to communicate with all members of the work force; and c) constructive and harmonious working relations with such employee organizations as may represent employees.

FAA cannot now command the full support of many members of the work force in its terminals and centers. Indeed, members of this Committee have never previously observed a situation in which there is as much mutual resentment and antagonism between management and its employees.

To overcome this condition, we have proposed that substantial effort be made to increase the effectiveness of those who are now supervisors. There is need, in addition, for improvement of existing communication processes within the ATS, and special need for the improvement of relations between the management of FAA and the organizations representing employees of the ATS.

Improving Internal Communications

The task of building effective processes for communicating to, and hearing from, employees located in the numerous facilities distributed throughout the United States is a substantial problem in organizational communication. The problem is exacerbated by the fact that most employees are engaged in rotating shift work and are assigned varying work weeks.

The Air Traffic Service relies upon the following means to communicate its goals, objectives, plans and procedures to employees throughout the organization.

- Written directives within the FAA directives system regarding personnel policies and procedures. (3000 series)
- Technical operational manuals pertaining to air traffic control procedures. (7000 series)
- FAA house organs, such as a bi-weekly newspaper (Horizons) and a weekly newsletter (Intercom).
- An Air Traffic Service Bulletin containing items of special interest to controllers but issued on a sporadic basis.
- Management staff meetings at the Washington, regional, area and facility levels.
- Facility meetings of "all personnel" conducted with varying degrees of regularity depending upon local management.
- Sporadic visits to facilities by representatives from Washington, regional and area offices.

To obtain employee views and reactions to management goals, objectives, plans and procedures, the Air Traffic Service relies generally upon:

- Information from first-line supervisors and facility officers.
- Informal suggestions, and suggestions submitted through the FAA Suggestion System.
- Unsatisfactory Condition Reports (UCRs) submitted on equipment and procedures.

- Informal complaints and formal grievances submitted under the FAA grievance procedure.
- COPCOM meetings, i.e., Controllers' Operating Procedures Committees.
- Meetings and correspondence with representatives of labor organizations and other employee associations.

This description of existing communications methods is not all-inclusive. It suffices to picture the structure of the communications system that does exist; yet in spite of this system, FAA's management has not been effectively communicating with its employees. This is due, at least in part, to the following:

- FAA's policy of decentralized management. Obviously, absolute uniformity in the administration of personnel policies is not achievable throughout an organization with a substantial (and desirable) delegation of operating authority to field officials. Yet, such delegation makes essential a) effective communication of guidelines for the implementation of policies to supervisors throughout the organization, and b) an effective system of monitoring to insure that policies are as uniformly administered as possible.
- The failure consistently to use the hierarchical channel formed by regional managers, area managers, facility chiefs and supervisors in communicating policies, plans and procedures to the work force.
- The ease and rapidity with which controllers located in widely dispersed facilities can communicate with each other and compare the application of policies, regulations and rules in different regions.
- The existence of competitive channels of communication in the form of various publications from employee organizations to their members throughout the work force.

- The lack of any apparent effort on the part of FAA management to develop a full understanding among controllers of what is being done, and why, and to learn the reactions and experiences of these individuals.

There is great dissatisfaction among the controller work force about their inability to communicate upwards. They contend that individuals who express dissatisfaction to management are labeled as disloyal; the filing of a grievance is the act of a trouble maker and to "make a wave" of any kind is a guarantee against promotion. Attempts to communicate with management through labor organizations have been fruitless -- in the controllers' view -- because such organizations are reluctantly recognized, if at all, as controller spokesmen.

A thorough re-examination of communications practices is urgently needed within the Air Traffic Service. If the Service is to enlist the interest and the loyalty of these employees it must devote more time and resources to creating a common bond of understanding and respect that does not now exist. Improved communications at all levels can provide a feeling of belonging, adequate recognition from supervisors for work well done and a greater sense of security through knowledge of and trust in the system.

Recommendations

1. To build more effective and continual two-way communications between supervisors and employees, the Committee recommends that the FAA:
 - a. Schedule quarterly meetings at each major facility, between controllers and representatives of the area and/or regional offices to exchange views on administrative and operational matters.

- b. See to it that meetings between facility management and all personnel are held on a regular, periodic basis.
 - c. Arrange work schedules so that to the extent possible, first-line supervisors remain on the same schedules as controllers under their jurisdiction.
 - d. Request that facility officers at the larger facilities occasionally vary their duty hours so that they may spend time on the evening and midnight shifts meeting and talking with controllers.
2. To strengthen the hierarchical channels as means of communication, we recommend that the FAA:
- a. Re-evaluate existing practices for communicating policies, plans and procedures to ensure that supervisors are provided promptly and directly with all information needed for the performance of the supervisory role.
 - b. Discontinue the communication of major policy changes through the use of "Intercom" or so time such publications as to ensure that supervisors have prior information.
 - c. Schedule more frequent meetings of facility chiefs within regions and nationally in order to develop a fuller common understanding of the policies, plans and procedures each is expected to implement.
 - d. Ensure the full and effective consideration of the reasons for and proven ways of communicating within an organization in supervisory and management training programs.
 - e. Increase the number of visits by officials from the FAA headquarters, and particularly those from the Air Traffic Service and the Office of Personnel, to facilities, and plan for their participation there in discussions with supervisors and controllers.

3. To ensure a positive and substantial effort to build a greater common understanding and mutual respect among personnel throughout the Air Traffic Service, we urge that the FAA identify a senior official as having responsibility for carrying out the foregoing recommendations and for devising such other means of two-way communications as are determined to be desirable.
4. To provide the FAA Administrator with accurate and timely information on field activities, we recommend that the existing program for monitoring policy implementation be improved.

Relations with Employee Organizations

After almost fifteen years of dealing with organizations representing employees within the Air Traffic Service, the FAA was confronted in 1968 and 1969 with an unprecedented crisis. That crisis was reflected in a succession of bitter and abusive exchanges between spokesmen for employee organizations and officials of FAA, a "slowdown" carried out by some controllers upon the apparent direction of their organization, and a mass reporting by a considerable number of controllers that they were absent because of illness. Threats of strikes and mass resignations were made.

Understanding of this crisis in the relationship between FAA's management and one or more of the organizations representing employees in the Air Traffic Service requires some background on the organizations that represent these employees, and the character of each. Four organizations are known to have substantial membership within the ATS. Two of these organizations are characterized as "professional societies" and their memberships include both supervisory and non-supervisory controllers.

1. Air Traffic Control Association (ATCA) - This is the oldest of the controller organizations. It was established in 1956 prior to the creation of the FAA in 1958 (i.e., during the tenure of the predecessor, the Civil Aeronautics Administration). It is by its

own description a professional society and not a labor union. Both supervisory and non-supervisory controllers (primarily from terminals and centers) are admitted to full membership in ATCA and may participate in the management and direction of the organization. ATCA sought no recognition as an "employee organization" (union) under E.O. 10988. Its intentions under E.O. 11491 are not as yet known, but it is presumed that it will continue its present "non-union" role.

2. National Association of Air Traffic Specialists (NAATS) - This organization was established in 1959. For a brief period it was recognized under E.O. 10988. Over the years, however, it has characterized itself as a professional society. Its membership is composed of non-supervisory and supervisory controllers employed primarily in flight service stations and any member may participate in the management and direction of NAATS. NAATS apparently has few, if any, members among controllers in terminals and centers.
3. National Association of Government Employees (NAGE) - This is an independent labor union of Federal employees which began organizing controllers in terminals, centers, and flight service stations following the issuance of Executive Order 10988 in January 1962. Its membership is composed primarily of non-supervisory controllers, although supervisors are eligible and do join. Because of the conflict-of-interest provisions of E.O. 10988, supervisors may not participate in the management and direction of the organization.
4. Professional Air Traffic Controllers Organization (PATCO) - This is the newest of the controller organizations, formed in January 1968. Only non-supervisory controllers in terminals and centers are eligible for full membership. Supervisory controllers

are eligible for associate membership but cannot participate in the management or direction of the organization.

PATCO was recognized originally as a professional society by the Acting Administrator of FAA in July 1968. In March 1969, however, the PATCO national office authorized local PATCO groups to seek recognition as employee organizations under E.O. 10988.

Because of the competitive nature and duplication of membership among the organizations involved, an analysis of their relative membership strength is difficult. No authoritative data as to the membership strength of each of these organizations is available. But the secondary data available to the Committee and the impressions formed in the course of extensive field visits, have led to the conclusion that PATCO probably represents a majority of the center and tower controllers; NAGE probably represents a substantial but apparently lesser number. ATCA and NAATS appear to have relatively large memberships, the latter primarily in flight service stations.

Prior to 1962, the "professional societies" that existed within the agency were independent, i.e., unaffiliated with any national labor organization. This has remained the case and can be attributed to the highly specialized nature of the occupation and to the fact that FAA is, for all practical purposes, the sole (non-military) employer of controllers. The FAA encouraged and supported these first organizations of controllers.

A Competitive Struggle

When President Kennedy issued Executive Order 10988 on January 17, 1962, a new element was introduced into the Federal system - the recognized right of government employees to form and join labor unions and to bargain collectively on matters affecting them. NAGE promptly and aggressively began organizing the controllers. It had considerable success in making inroads into the membership of

the professional societies which had rejected Executive Order 10988 as inappropriate because they considered controllers to be "professionals" - not unionists. NAGE soon became the dominant organization among controllers.

In the midst of this competition between NAGE and the "professional societies" for membership among the controllers, FAA issued a formal management policy, Order 1210.7, "FAA Relationships with Professional Societies". This order established as official agency policy the encouragement of participation in professional societies. Although the order provided for a differentiation of dealings with unions as opposed to professional organizations, this distinction was not clear and the order produced confusion for field managers in their dealings with competing organizations. Moreover, the order is an irritant to many union members and is viewed by them as a deliberate management action to assist ATCA and NAATS in the competition for controller membership.

The FAA-NAGE relationship has not been a happy one. Dealings between them have generally been at arm's length and have been conducted in a strained atmosphere. NAGE attributes the situation to FAA's "anti-union" policies. FAA considers NAGE to be "irresponsible".

Despite its success in organizing controllers, NAGE apparently was not successful in obtaining a greater voice for the controllers regarding working conditions. It was in this strained atmosphere that the fourth and newest organization, PATCO, was formed in January 1968.

FAA-PATCO Relationship

A review of early PATCO newsletters discloses that FAA management welcomed PATCO on the scene and perhaps viewed it as an escape from the militant tactics of NAGE. The fact that PATCO portrayed itself as a professional society undoubtedly contributed

to this happy - but short-lived - relationship.

On July 1, 1968, the FAA Acting Administrator publicly announced that FAA had established a professional society relationship with PATCO; simultaneously it was made clear that this action in no way involved recognition of PATCO as an employee organization under Executive Order 10988.*

Shortly thereafter the amicable FAA-PATCO relationship began to change. The first issue of the PATCO Journal contained an editorial urging airlines and other aviation interests to contribute financial support to PATCO by becoming corporate members, purchasing PATCO advertising, etc. The editorial suggested that aviation interests which contributed financial support would be remembered by air traffic controllers who were members of PATCO. The editorial also implied that those who did not contribute financial support would be "persona non grata" to controllers.**

At its convention in Chicago on July 3, 1968, PATCO announced a program called "Operation Air Safety". This program instructed PATCO members to control air traffic literally "by the book". Following the announcement of Operation Air Safety there was a monumental jam of air traffic throughout the United States. The causes of this situation were debated in many quarters.***

* FAA Intercom - July 1, 1968

** PATCO Journal, Vol. I, May-June 1968 (p. 36)

*** There is a school of thought which contends that the traffic jam - particularly in the New York area - was primarily the culmination of ever increasing traffic which finally reached the saturation point. This theory, therefore, would hold that - at least in part - PATCO merely took advantage of a process already underway to dramatize the plight of its members.

It remains a moot question as to whether the controllers exceeded or merely followed the letter of the regulations. In August PATCO discontinued its program and the air traffic returned to normal.

More problems developed between PATCO and FAA when PATCO, in a newsletter, instructed its members that they should not at any time exceed the safety limits of their own judgment.* The instructions provided that should a supervisor insist that a controller use separation criteria which he felt for any reason to be inadequate, the controller must refuse to follow the supervisor's directions. This was construed by FAA as an open and serious challenge to management's right and obligation to manage the air traffic control system.

In the year between July 1968 and June 1969 the FAA-PATCO relationship continued to deteriorate. PATCO continued to maintain its position that controllers must rely solely on their own judgment in the control of air traffic.

The situation reached crisis proportions on June 18, 19, and 20, 1969, when approximately 500 controllers at various facilities throughout the country failed to report for work. These controllers, who were largely PATCO members, called in sick. PATCO later explained that the controllers were made ill because of their displeasure with the FAA Administrator's remarks before a Congressional Committee on a bill to improve the pay and working conditions of the controllers.** After investigating the matter, the FAA issued

* PATCO membership Newsletter No. 11, March 21, 1969.

** Hearings before the Sub-Committee on Aviation, Committee on Commerce, U.S. Senate 91st Congress, First Session, pp. 24-25 and p. 383.

suspensions to controllers who could not substantiate their illnesses and in July 1969, terminated the dues withholding agreement with PATCO because of its involvement in the "sick out". That was the situation when the Air Traffic Controller Career Committee was appointed.

Since that time the situation has not improved. PATCO's request for exclusive recognition at the national level for a nationwide unit of air traffic controllers under E.O. 10988 was denied by FAA. The agency held that such a unit would not meet the guidelines established by the President's Temporary Committee on the Federal Employee-Management Relations Program. The President's Committee had stated that national exclusive recognition should not be granted unless meaningful negotiations could not be carried out at a lower managerial level. The FAA has been negotiating contracts at the facility level for many years and cited this as proof that meaningful negotiations could and should take place at the lowest possible level.

In addition to this, the FAA also held that the PATCO national organization was not eligible for recognition because of its advocacy and use of national demonstrations and slowdowns despite the Federal prohibition against such conduct. The FAA did agree, however, to recognize local PATCO organizations provided they adhere to the President's Code of Fair Labor Practices.

PATCO responded to the FAA action by threatening to take over the air traffic system.

No single cause accounts for this crisis in the relation between FAA's management and the organizations representing its employees. Yet our observations suggest that among the most important is the failure of FAA's management at all levels to truly understand the role of the employee organizations and to accept them as not only legitimate, but hopefully as collaborators in building understanding,

satisfaction and an esprit d' corps. They have tended to deal with unions reluctantly and at arm's length. Many FAA managers seem to pay lip service to the role of labor organizations but view any criticism by union representatives as disloyal conduct. They appear to feel more comfortable with the "professional society" approach to labor relations which existed in the past and which they have continued to foster.

On the other hand, the FAA has not been solely responsible for the present aggravated state of relationships between the management and employee organizations. Regardless of how FAA responded to PATCO, that organization has resorted to tactics that were designed to maximize its exposure in the press and television and exacerbate its relationship with FAA's management. Its choice of tactics, the intemperate and irresponsible nature of the language used in much of its correspondence and public utterances, and its constant resort to personal attacks have continued to fuel the fire.

The time has come to improve the state of employee-management relations. Continuation of the present situation is untenable.

Recommendations

Several steps need be taken to resolve immediate problems and to create an improved environment within which air traffic controllers and FAA management can solve their problems.

1. To take full advantage of the new labor/management Executive Order (11491) to create an improved climate in which controllers and management can work cooperatively, we recommend that FAA:
 - a. Re-evaluate its philosophy and practices in dealing with employee organizations in the light of the spirit and intent of E.O. 11491.

- b. Revoke or enforce its prevailing order relative to relationships with professional societies and prevent relationships with labor organizations from developing outside the context of E.O. 11491 in the future.
 - c. Announce that in light of E.O. 11491, it is prepared to reconsider its position on national bargaining units. In this connection, it would be advisable for the Administrator to appoint a labor consultant of national reputation to recommend the most viable bargaining unit or units for the agency. Such a recommendation would be of great value in responding to the Department of Labor when this question is inevitably raised under the new Executive Order procedures.
 - d. Expedite, in good faith, the resolution, under E.O. 11491, of all existing labor/management problems.
2. To improve day-by-day working relationships between FAA and the organizations representing employees of the Air Traffic Service, we recommend that FAA:
- a. Designate a single official immediately responsible to the Administrator for handling all relationships with employee organizations at the national level and ensure that other organizational units of FAA refer to this official all matters involving these relationships and work with and through him in resolving issues that arise.
 - b. Discourage the tendency of employee organizations to use personal contacts or other means to escalate labor relations problems to the Administrator's level.

- c. Seek the cooperation of employee organizations in ensuring that local problems be handled at the appropriate field level and not be referred to the Washington level. This will necessitate that FAA ensure that facility chiefs are delegated adequate authority to resolve such problems and are trained to handle employee and management relations effectively.
- d. FAA should announce a policy by which a one-year leave of absence without pay will be granted to employees for service as officers of recognized labor organizations which deal with FAA. Such leaves could be extended for a maximum of one year.

APPENDIX I

BIOGRAPHICAL INFORMATION ON MEMBERS OF THE AIR TRAFFIC CONTROLLER CAREER COMMITTEE

JOHN J. CORSON, Chairman. Chairman of the Board, Fry Consultants, Inc. Consultant to Board Chairman, Urban Coalition and to the President, Carnegie Foundation. Formerly, Director, Bureau of Old Age and Survivors Insurance; Bureau of Employment Security; and U. S. Employment Service; Deputy Director General, UNRRA; member of staff McKinsey & Co., management consultants; Professor of Public and International Affairs, Princeton University. Member, American Society for Public Administration (former president); Trustee, Educational Testing Service.

PETER W. BERNHARD, Member. Co-owner, Installation Specialties, Inc. (electronics manufacturing and installation company). Formerly, Air Traffic Control Specialist, Procedures Section, FAA Eastern Region; air traffic controller, J. F. Kennedy International Airport Tower, New York.

Dr. A. D. CATTERSON, Member. Deputy Director, Medical Research and Operations, NASA Manned Spacecraft Center, Houston, Texas. Formerly, Chief, Flight Medicine Branch and Medical Officer, NASA Manned Spacecraft Center; Chief, Resident Aerospace Medicine, Foundation for Medical Education and Research. Member, Texas Medical Association, Aerospace Medical Association, Houston Academy of Medicine.

Dr. ROBBEN W. FLEMING, Member. President, University of Michigan. Formerly, Professor of Law, University of Michigan; Professor of Law and Chancellor, University of Wisconsin; Professor of Law, University of Illinois; Professor of Industrial Relations, University of Illinois; industrial arbitrator, Federal Mediation and Conciliation Service, American Arbitration Association. Member, Atomic Energy Labor Management Relations Panel; Industrial Relations Research Association; National Academy of Arbitrators.

ARTHUR D. LEWIS, Member. Senior Partner and Chairman, Executive Committee, F. S. Smithers and Co. (investment bank), New York, N. Y. Formerly, President, Eastern Air Lines; Senior Vice President, General Manager, Eastern Air Lines; President, Chief Executive Officer, Hawaiian Air Lines. Member, Board of Regents, University of Hawaii.

JAMES M. MITCHELL, Member. Director, Advanced Study Program, Brookings Institution. Formerly, Commissioner, U. S. Civil Service Commission; Deputy Assistant Secretary for Manpower and Personnel, Department of Defense; Associate Director, National Science Foundation. Member, Board of Trustees, George Washington University; American Society for Public Administration; Public Personnel Administration.

STANLEY H. RUTTENBERG, Member. President, S. H. Rittenberg Associates, Inc., labor consultants, and Editor, Manpower Information Service, Bureau of National Affairs, Washington, D. C. Formerly, Assistant Secretary of Labor and Manpower Administration, U. S. Department of Labor; Special Assistant to Secretary of Labor; Director, Department of Research, AFL-CIO; Member, Executive Board Industrial Relations Research Association.

BERTRAND M. HARDING, Staff Director. Vice President, Fry Consultants, Inc., Washington, D. C. Formerly, Acting Director, Office of Equal Opportunity; Deputy Director, GEO; Deputy Commissioner, Internal Revenue Service; associated with Atomic Energy Commission and Veterans Administration. Member, American Society for Public Administration.

APPENDIX II

COMMITTEE STAFF

Francis J. Bassett, Federal Aviation Administration

Willie C. H. Brown, U. S. Civil Service Commission

Gene P. Chufar, Internal Revenue Service

Joseph E. Colmen, Private Consultant

Edward V. Curran, Department of Transportation

Paul A. Greene, Federal Aviation Administration

William C. Keepers, Federal Aviation Administration

Edmund H. Longen, Department of Transportation

Joseph W. Noonan, Federal Aviation Administration

L. R. Ramos, Federal Aviation Administration

Bernard E. Shultz, Internal Revenue Service

Robert H. Stevenson, Federal Aviation Administration

Hayden W. Withers, M.D., Federal Aviation Administration

Ellen Wormser, Fry Consultants, Inc.

APPENDIX III

FACILITIES VISITED BY THE AIR TRAFFIC CONTROLLERS CAREER COMMITTEE

Centers

Atlanta (Hartson, Georgia)
Chicago (Aurora, Illinois)
Jacksonville (Hilliard, Florida)
Los Angeles (Palmdale, California)
New York (Islip, Long Island)
Washington, D. C. (Leesburg, Virginia)

Towers

Atlanta, Georgia
Chicago, Illinois (O'Hare)
Columbia, South Carolina
Fort Lauderdale, Florida
Jacksonville, Florida
Los Angeles, California
Miami, Florida
New York (Kennedy, LaGuardia and NY Common IFR Room)
Opa Locka, Florida
Oklahoma City, Oklahoma (Will Rogers Field, Wiley Post Airport.
Tinker Air Force Base Radar Approach
Control Facility)
Roswell, New Mexico

Stations

Oklahoma City, Oklahoma (Wiley Post Airport)*
Islip, New York (McArthur Field)
Roswell, New Mexico*
Washington, D. C. (Washington National Airport)

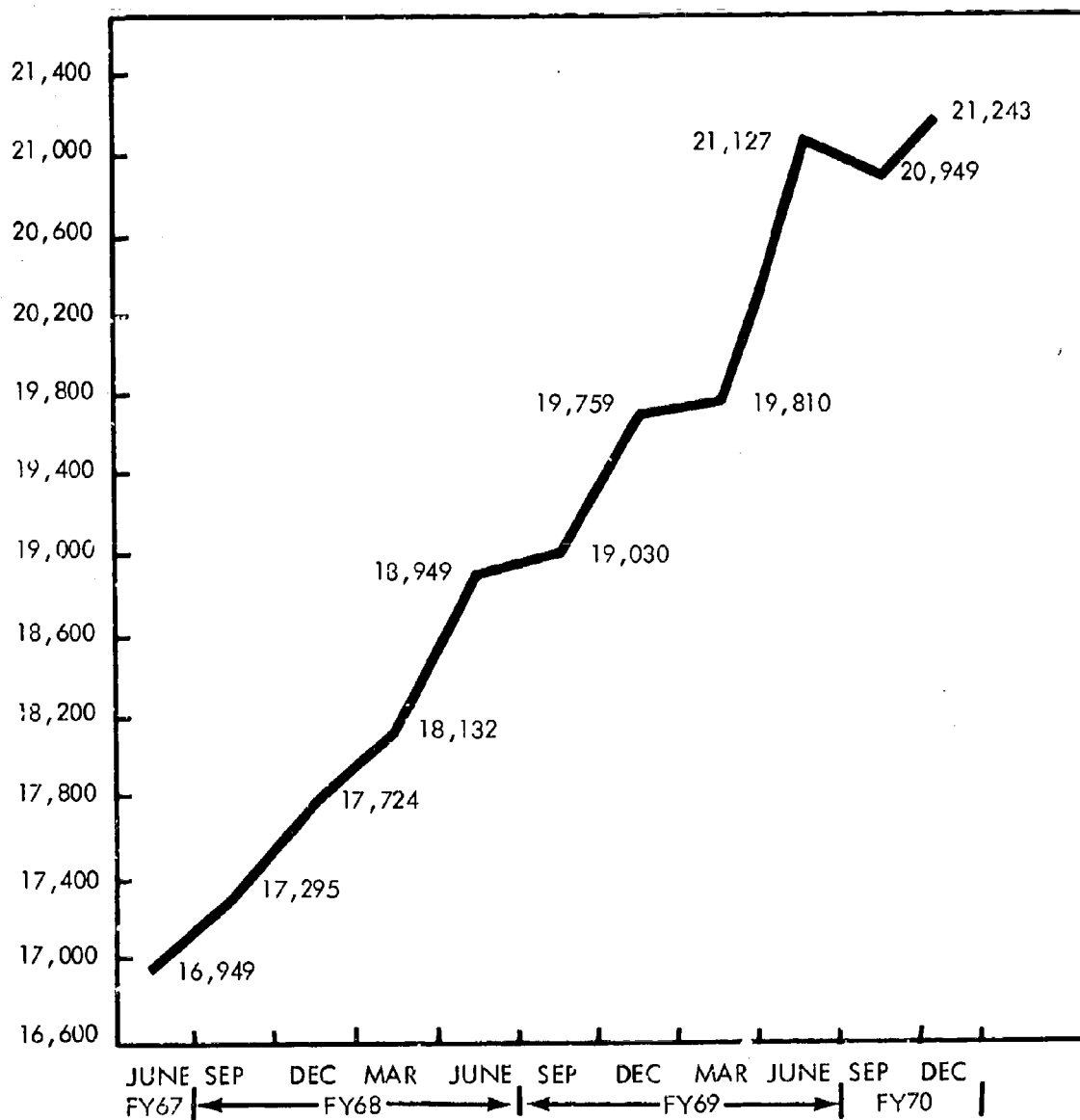
Others

Chicago, Illinois Area Office
National Aviation Facilities Experimental Centers (NAFEC), Atlantic City, N.J.
Aeronautical Center, Oklahoma City, Oklahoma (FAA Academy - air traffic controller training school)

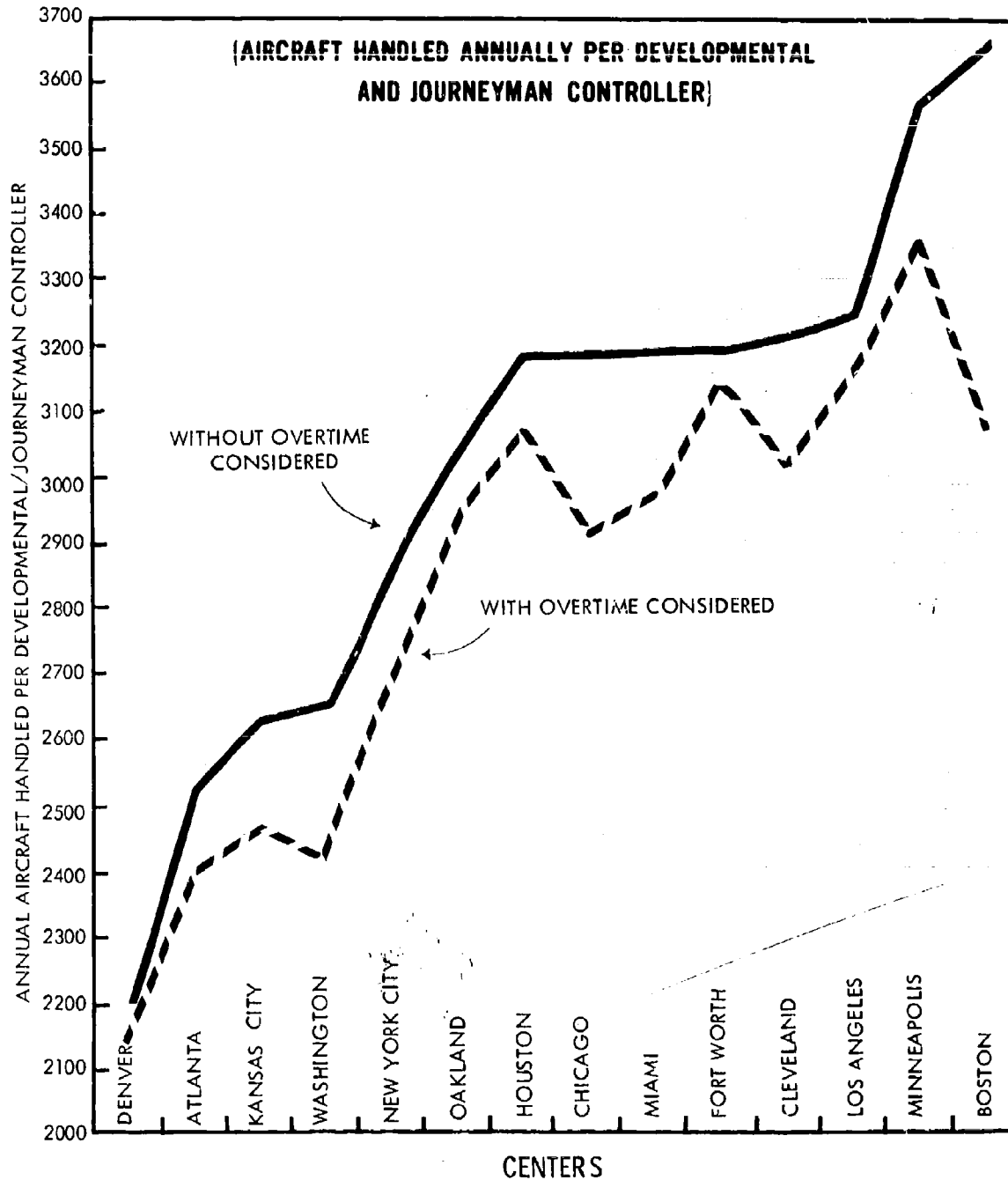
*Joint meeting with available station and tower personnel.

APPENDIX IV

BUILD UP OF AIR TRAFFIC CONTROLLER STAFF 1967 - 1970



APPENDIX V **PRODUCTIVITY OF CENTER CONTROLLERS**



APPENDIX VI

STAFFING SUMMARY - SELECTED CENTERS

Centers	Total Positions ¹ Authorized FY-69	% Filled 9/69	Journeyman ² Authorized FY-69	% Filled 9/69	Devel. Authorized FY-69	% Filled 9/69
1. Chicago, Ill.	626	90.7	453	65.3	121	182.6
2. New York, N. Y.	609	98.0	440	75.0	118	176.3
3. Cleveland, Ohio	542	100.2	362	93.4	126	116.7
4. Washington, D. C.	494	100.2	352	74.7	97	187.6
5. Fort Worth, Texas	378	102.1	306	79.4	28	364.3
6. Atlanta, Georgia	441	109.5	278	103.6	119	123.5
7. Indianapolis, Ind.	425	89.2	269	74.3	120	119.2
8. Houston, Texas	383	99.5	292	75.7	38	278.9
9. Boston, Mass.	347	100.0	245	99.4	67	132.8
10. Los Angeles, Calif.	371	93.8	261	69.7	78	171.8

¹ Positions include Trainees, Developmentals, Journeymen and Crew Chiefs

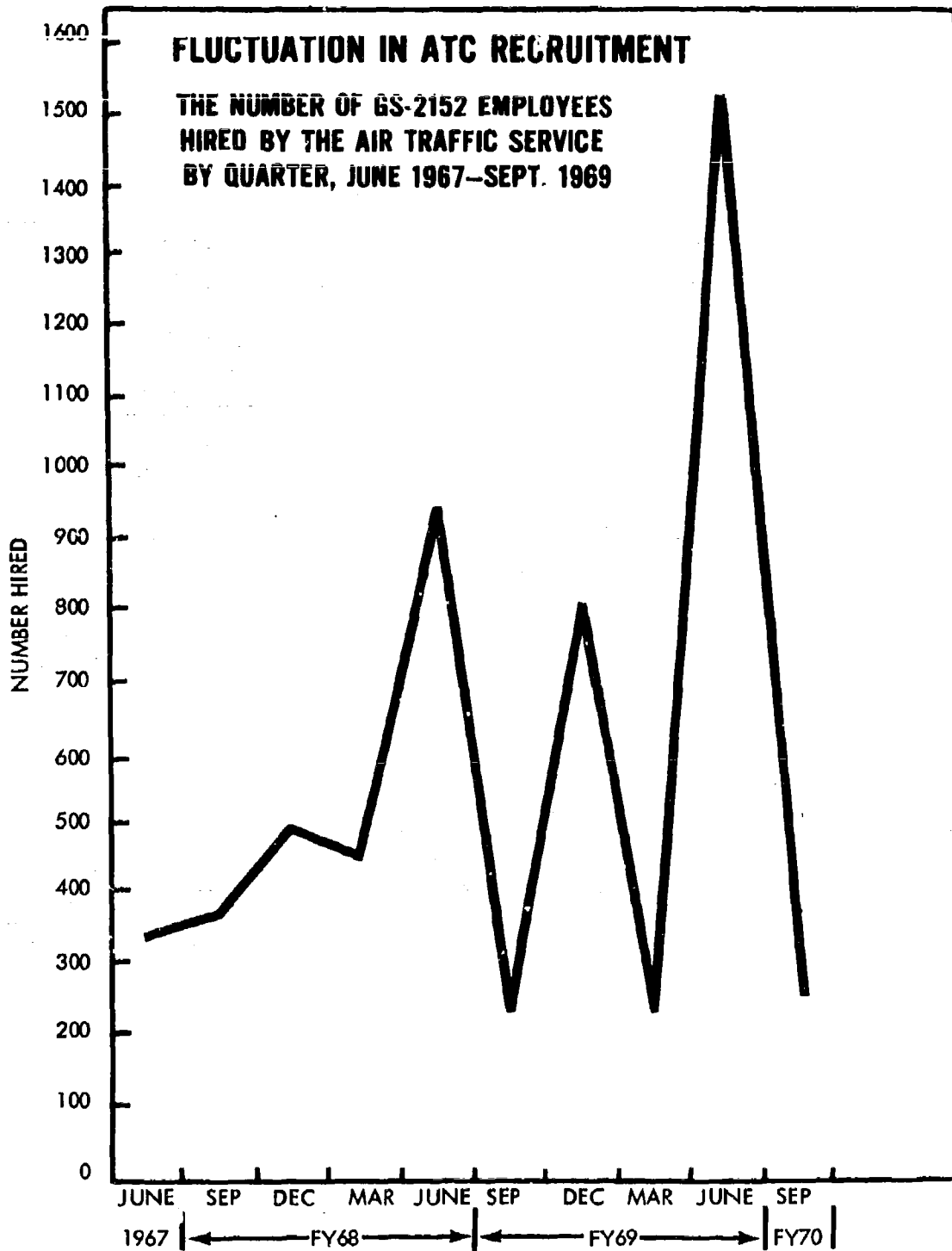
² Journeymen include GS-11, 12 and 13

APPENDIX VII

ATTRITION AS A PERCENT OF ACCESSIONS
DURING CY 1967, 68, 69

<u>CENTERS</u>	<u>TERMINALS</u>	<u>STATIONS</u>
1967 - 17.42%	1967 - 14.02%	1967 - 8.85%
1968 - 17.76%	1968 - 12.55%	1968 - 9.69%
1969 - 22.39%	1969 - 10.69%	1969 - 9.56%

APPENDIX VIII



APPENDIX IX

FACILITY IMPROVEMENTS REQUESTED AS COMPARED WITH IMPROVEMENTS AUTHORIZED AND SCHEDULED

	<u>21 Towers</u>	<u>15 Centers</u>	<u>21 Stations</u>
A. Control Equipment*			
Improvements Requested in FY-67, 68, 69	231	505	65
1. Improvements accom- plished as of 10-1-69	118	227	34
2. Improvements scheduled for completion by 6-30-70	28	76	6
B. Environmental Improvements**			
Requested in FY-67, 68, 69	129	130	45
1. Improvements accom- plished as of 10-1-69	93	94	36
2. Improvements scheduled for completion by 6-30-70	10	11	3

* radar, communications, etc.

** lighting, noise levels, chairs, carpeting, etc.

APPENDIX X

VACATION LEAVE GRANTED AT SELECTED FACILITIES DURING THE PERIOD MAY 15, 1969 THROUGH SEPTEMBER 15, 1969

	# of Non-Supervisory Controllers*	# of weeks leave requested by # of Controllers	# of weeks granted to # of Controllers
<u>Centers</u>			
Chicago	417	634/340	426/276
Fort Worth	364	498/267	498/267
Miami	261	172/86	172/86
New York	559	799/499	799/499
Seattle	217	169/91	146/87
<u>Towers</u>			
Boston	54	63/43	62/43
Chicago O'Hare	95	71/41	71/41
Dallas	26	26/17	26/17
Los Angeles	64	75/42	79/55
Miami	76	198/72	198/72
<u>Stations</u>			
Cleveland	27	45/24	45/24
Denver	28	32/13	32/13
Houston	29	50/32	49/31
Los Angeles	39	49/22	49/22
Memphis	17	24/12	24/12
Totals	2273	2905/1601	2676/1545

* Estimated average number controllers

APPENDIX XI

PROPOSED REVISED TRAINING CURRICULUM

<u>Centers</u>	<u>Content</u>	<u>Length</u>	<u>Timing</u>	<u>Location of Training</u>	<u>Staff Required</u>
New Recruits	-Orientation -Flight data/ interphone training -Facility Area Rating	3-5 weeks	Given upon entrance on duty (EOD)	Facility *(RTF)	Facility training staff
Developmental	-Radar/non-radar air traffic control -Sector checkouts	10-12 weeks 2 weeks	3-8 months after EOD Upon completion of Academy	Academy Facility	Academy staff Facility staff
Transferees	(Term. & Center) -Minimum sector/ position checkout requirements	3 weeks	Upon selection/ detail to new facility	-Facility -NAFEC -Academy	Facility staff
Journeyman	-Proficiency training -Refresher training	Variable	Annually	Facility & Academy	Facility training staff Academy staff

* One center in each region could be designated as the Regional Training Facility (RTF).

PROPOSED REVISED TRAINING CURRICULUM

<u>Terminal</u>	<u>Content</u>	<u>Length</u>	<u>Timing</u>	<u>Location of Training</u>	<u>Staff Required</u>
New Recruits	-Orientation -Flight data -Ground control -Local control -Radar approach control	6-8 weeks	Given upon entrance on duty (EOD)	Academy	Academy staff
Developmental	-OJT Position checkout -Junior/senior rating	Indeterminate- (Max. one year after EOD)	After completion of Academy	Facility *RTF	Special terminal training; staff
Transferees	(Term. & Center) -Minimum sector/position checkout requirements	3 weeks	Upon selection/detail to new facility	-Facility -NAFEC -Academy	Facility staff
Journeyman	-Proficiency training -Refresher training	Variable	Annually	Facility & Academy	Facility training staff Academy staff

* One Level II or III radar approach control facility in each region could be designated as the Regional Training Facility (RTF).

PROPOSED REVISED TRAINING CURRICULUM

<u>Flight Service Station</u>	<u>Content</u>	<u>Length</u>	<u>Timing</u>	<u>Location of Training</u>	<u>Staff Required</u>
New Recruits	Continue present course	14 weeks	Given upon entrance on duty (EOD)	Academy	Academy staff
Developmental	Continuation of OJT checkout to Journeyman level				
Transferees	Station	OJT checkout for facility rating at new facility			Academy staff augmented by facility staff
Journeyman	-Proficiency training -Refresher training	Variable	Annually	Facility & Academy	Facility training staff Academy staff

APPENDIX XII

AIR TRAFFIC STANDARDS HISTORY

The first standards specifically covering the air traffic control specialist occupation were issued in 1949 by the Civil Aeronautics Administration. They were prepared by the agency after intensive study by classifier and operating personnel and approved by the Civil Service Commission.

These standards based grades or numbers of positions in a grade upon the type of control (approach and non-approach) exercised by the facility, the position of operation (e.g., flight data, sector control) manned by the employee, and, in terminals, the average monthly volume of facility activity weighted for local, itinerant, and air carrier flights. Standards for station positions graded international and territorial stations higher than domestic stations.

In 1953, the Civil Service Commission began a project which ran through 1956 and resulted in two sets of published standards, the first in 1954-55 and the second in 1956. The study was conducted by a Commission classifier.

The 1954-55 issuance established a specific series (GS-2152-0, Airways Operations Specialist) covering centers, terminals and stations. This standard continued a single level of center with grades within the center being based upon the position of operation being manned by the employee. It also continued to grade international and territorial stations higher than domestic stations.

In terminals, the 1954-55 standard continued to grade non-approach control terminals at a level lower than approach control terminals. Within the approach control group, the standard introduced a concept which distinguished among facilities on the basis of operations per controller or on the basis of numbers of control positions of operation required. A complex (higher graded) facility was one in which the control function was divided into three or more segments for 400 hours per month or in which the total annual operations or total annual instrument approaches exceeded 13,500 or 350 per controller. Because of controversy over these terminal criteria, the Commission did not require their implementation.

Instead, it began an immediate revision of the standards, which was published in 1956.

The 1956 standard established two levels of center, moderate and high activity, the high activity center being one that had regularly recurring peak day traffic of 500 or more instrument departures and having significant portions of overflying, ascending, and descending traffic. It also established a distinction among sector control positions in high activity centers. A higher grade level was assigned to work on "Terminal and Approach" sectors. A terminal and approach sector was one with a high volume of traffic and a preponderance of approach or departure traffic.

In stations, the 1956 standard established two levels of domestic station, with the grade distinction in air ground work being the 60-month activity count for the individual specialist.

In terminals, the 1956 standard established three levels of approach control terminal, with grade distinctions being based on the number of control segments and the average annual volume of total operations or average annual volume of instrument approaches.

The standard gave rise to a great deal of controversy, both during the project and following the implementation. There was a large volume of Congressional inquiries, unfavorable comments in private sector aviation publications, confrontation between controllers and the Civil Service Commission, and argument between the Department of Commerce and the Commission. There were also continuing questions regarding interpretation of the "average per controller" element, e.g., was it to be based on authorized or actual staffing, how was work on overtime to be counted, etc.

The standards implemented in 1959 were the result of an extremely detailed study begun in 1957-58 by the CAA and the Civil Service Commission. Partly to assure obtaining the most accurate data on the occupation and partly to repair damage to employee relations caused by the 1956 standard, the detailed job analysis was done by panels of field facility employees convened in Washington. Classification analysts from CAA, Commerce Department, and the Commission attended the meetings to provide assistance and guidance.

These panels were asked first to describe what they felt were inequities or inadequacies in the then current standards. Specialists in all options pointed out that current standards did not give specific credit or emphasis for items such as difficult terrain, mixed traffic, multiple airports, tower en route control, complex airways, limitations on use of altitudes, type of working tools available, weather, variety of aircraft, airport layout, restricted areas, joint military and civil use operations, man-made obstructions, and presence or lack of other control facilities. In addition, tower and station panelists voiced strong opposition to the idea of "dividing operations by controllers" to determine grade. Center panelists cited opposition to the "T and A Sector" concept which differentiated grades within centers and between centers.

While almost all panel members felt that type of control exercised or service performed and volume of activity were the primary factors measuring difficulty, they went to considerable effort to devise a method of using other elements for additional credit. They found that these additional elements were either impossible to measure, were generally reflected in volume figures, or made no difference in the ranking of facilities. Thus, their final recommended elements for grade differentiation were type of control exercised or service performed and annual facility volume of activity. In centers, volume of activity was used only for grading positions above the working level.

The implementation in 1961 was the result of a short intensive study by the Civil Service Commission analyst who had worked on the 1959 standards. Its major purpose was to determine whether operational and technological changes had had sufficient impact to warrant changing the occupational grade structure. The analyst found that certain functions had increased in difficulty, that certain new programs had been added, and that certain functions had increased to the point where they required the full time of an employee. Therefore, higher grades were provided for coordination of radar functions in terminals and for inter-sector and flow control work in centers having new radar programs. Full working levels in all stations became GS-9. The changes were issued in interim letters by the Commission and FAA was permitted to implement them immediately. FAA was to prepare formal standards incorporating the provisions of the interim letters.

The 1963 standards (implemented in 1964) were primarily a formalization of the 1961 interim letters. Exceptions to this were higher grade levels for certain high activity VFR towers, changes in the descriptions of progression grade levels in terminals and centers, and raising the basic tower working level to GS-10 and the basic radar approach control tower working level to GS-11. During the revision of the standard, however, the Air Traffic Service made an effort to modify terminal volume of activity criteria by using additional factors such as type of aircraft operation involved, pattern overlaps, noise abatement requirements, obstructions, radio contacts, and en route control segments. They did not prove practical and volume criteria remained substantially the same as those of the 1959 standard.

APPENDIX XIII

STAFF PAPER ON

ADEQUACY OF AIR TRAFFIC CONTROLLER COMPENSATION IN RELATION TO OTHER OPERATIONAL GROUPS

Within the Federal service, the grade structure and consequent basic pay for controllers are in full alignment with standards for comparable occupations, and possibly in advance of certain of these. No published standard was found to give more liberal treatment.

- a. As part of the 1968 Civil Service Commission standards study, cross-series validation was made to a number of published standards and other grade-determining guides. According to Civil Service Standards Division representatives, they included validating comparisons to the following:

1. Aircraft Operations Series GS-2181(including pilots)
2. Equipment Specialist Series GS-1670
3. Accountant Series GS-510
4. Personnel Management Series GS-201
5. Internal Revenue Officer Series GS-1169
(These series were selected as similar in having a two-grade apart professional-type grade structure, but not a strict professional educational requirement for entry.)
6. Interpreter Series GS-1047
(This series was selected because of certain resemblances to Air Traffic Controllers in memory and rapid action requirements, and the commitment responsibility once an oral translation was made.)
7. Medical Officer, Medical Technologists, and Pharmacists
(These series were selected because of the responsibility for human life involved, e.g., in the pharmacists providing the correct drug and dosage, rather than something which might be harmful.)
8. The prior 1963 standard for GS-2152, giving due weight to occupational changes subsequent to that date.
9. The Commission's internal-use evaluation tool, "Guide for Validating Non-supervisory Grade Levels in Position Classification Standards for Professional and Administrative Occupations."

In these studies, entrance level requirements, progressions, and working levels were stated to have been compared to insure consistency in the new GS-2152 standards with grade level concepts in the other lines of work.

- b. Independent cross-validating checks were made by the Committee's staff with related standards. Special attention was given to the Aircraft Operations series, GS-2181, which includes positions of pilots, co-pilots, flight instructors and related staff specialists, navigators and flight engineers. The working levels for pilots range from GS-9 (flying light planes or helicopters under visual flight rules) through GS-11 and 12 (flying passengers in light planes over established airways, the higher grade being when there are a variety of destinations, some unfamiliar), to GS-13, the normal top journeyman grade, "to fly heavy twin or multiengine airplanes on extended flights with responsibility for transporting passengers to and from a wide variety of domestic or foreign points." There is also a non-supervisory situation for Flight Test Pilots, where assignments "are characterized by a substantial degree of hazard and involve application of the knowledges, skills, and abilities required to conduct approval tests of new or critically modified aircraft." In the judgment of Committee staff specialists, the GS-13 commercial-type air pilot situation described is at least as good in grade value as the top air traffic controller journeyman (GS-13), and the hazardous-type Flight Test Pilot, GS-14, is superior in classification value.

Other compensation and allowances, including overtime pay and night differential and holiday pay, are equivalent or better to those for comparable Federal occupations. Recent special legislation on overtime applicable to air traffic controllers results in more liberal treatment than is afforded other professional, administrative, and technical Federal employees at equivalent grade levels.

Under the legally established comparability principle for Federal pay for employees under the statutory systems (including the Classification Act system in which air traffic controllers are currently included), basic pay for all positions in the system can be expected to be adjusted periodically to advances in private industry pay. Under present methodology this equivalence is determined for a body of selected comparable occupations in metropolitan areas, through annual surveys conducted by the Bureau of Labor Statistics.

Direct comparability of compensation for Federal air traffic controllers with particular industry occupations is difficult because no direct match exists, except for a small body of municipal positions, whose pay generally follows the Federal occupation.

- a. Air traffic control specialists in the military services are typically enlisted ratings, with pay substantially below Federal professional scales; there are, of course, other factors applicable in setting military pay which preclude direct comparisons.

- b. The closest private industry occupation found is that of Air Line Dispatcher (or Flight Superintendent) for commercial air carriers. These positions appear to be closely similar to, but more difficult and responsible than, the Flight Service Station option of the Federal GS-2152 series. In addition to knowledges like those of Station journeymen, they are required to have additional knowledges (such as cargo weights and stowage methods on aircraft). They also have additional commitment responsibilities such as a veto power (exercised concurrently with the aircraft pilot) on whether the flight should be made, which Federal air traffic control specialists in the Flight Service Station option do not have. On the basis of job evaluation principles, the commercial carrier Air Line Dispatcher, based on a projection upwards of the present GS-11 ceiling for the FSS journeyman, would be comparable to the GS-12 and GS-13 journeymen levels for the Terminal and Center options. Pay for Air Line Dispatchers appears roughly comparable to that for these grade levels in the Federal Service.
- c. Other "ground", i.e., non-operating, white collar positions for the air transportation industry are also in line, considering the relative differences in occupational content. The only exception is Flight Deck Operating positions, i.e., airline pilot, co-pilot, and flight engineer. This is a special case, which will be considered below.

The occupation of commercial airline pilot is believed not to be directly comparable to air traffic control specialists, and the unusually high pay of airline pilots is based on special factors not applicable in the Federal system, not even to comparable positions of Federal aircraft pilots, let alone air traffic control specialists.

- a. For historic reasons, including past labor contract negotiations, commercial flight operating positions (pilots and associated jobs) are among the highest paid U.S. occupations (according to the Labor Department), and are paid on a special basis, different from non-operating employees. According to a 1967 Labor Department study, "certified carriers' flight deck employees are paid in accordance with a basic wage formula which takes into consideration the number of flight hours, miles flown, gross weight and speed of the plane, and longevity pay. In addition, collectively bargained agreements covering flight deck employees provide for minimum monthly guarantees; pay for pre-flight and post-flight work, pay for training on new equipment; and deadheading pay (when traveling as a passenger to another airport) among other guaranteed and supplemental wage payments. Pay for non-operating employees, in contrast to that for flight deck personnel, is based on an hourly, weekly, or monthly basis." As a result of these pay practices, flight deck operating personnel, who constitute 12% of total certified carrier employment, receive 24% of the gross payments to employees. Pilots in the largest commercial jet liners may receive up to \$50,000 per year. When the new, larger aircraft are placed in operation, salaries are expected to rise to \$57,000 per year.

- b. Some air traffic controllers have contended that their pay should be related to that of commercial pilots on the basis that both occupations have a responsibility for the safety of air passengers. However, air carrier "non-operating" staff, i.e., ground personnel and cabin flight employees, are paid on a different, and much lower, basis than pilots, co-pilots, and flight engineers. This time-based system of payment, more directly comparable to the Federal system of annual salaries, includes carrier ground control staffs, among whom the air line dispatchers or flight superintendents appear to be much more closely related to Federal air traffic control specialists than are aircraft pilots. One obvious difference between pilot responsibility and that of the air traffic controller is that the pilot's actions directly affect his own physical safety as well as that of others. The knowledges and skills required of a pilot are significantly different from those of controllers, and his responsibilities extend to circumstances and periods when he is not getting directions from controllers as well as to those when he is responding to controller instructions. Similar findings were reached when a proposal to relate controller pay to that of pilots was considered during the 1965 U.K. Ministry of Aviation study by a blue-ribbon "Committee on the Air Traffic Control Officer Class" (the Radley Report, so-called after the Committee's Chairman, Sir Gordon Radley, former Director General of the Post Office). This Committee concluded: "In particular, there was no parallel with the really critical elements of a pilot's task: that is to say the problems of landing and take-off that demand all his skill, knowledge and experience. Positive air traffic control is exercised over only a small area of the earth's surface. The pilot, on the other hand, is competent to deal with all aspects of air navigation. We formed the view that the pay of pilots was of no relevance in determining the pay of ATCO's (Air Traffic Control Officers), and that this held good whether the pilots were in the employment of airlines or of the Department."
- c. The Radley Committee's basic conclusion, quoted above, seems equally applicable to the corresponding occupations in the United States, with the exception of the general relationship through the Classification Act of pilot grade structure and that of air traffic controllers. Pilots, under the December 1967 Civil Service Commission classification standards, range in level from GS-9 (for routine flights in light planes only) to GS-13 for a top journeyman level on heavy commercial-type planes, with GS-14 reserved for unusual positions, such as the most difficult test pilot work. No direct comparison is made for pilot pay in government to pilot pay in certificated carriers, primarily because of the need to preserve general alignment with related positions within the Federal service. Alignment problems already exist between air traffic controllers and associated positions in other series, such as the FAA's electronics technicians and maintenance engineers. To effect a pay relationship based on comparisons to airline flight personnel would further strain internal FAA alignment, including compensation alignment with FAA's own pilots. Anything approaching top commercial pilot pay would bring air traffic controller compensation above that of the FAA Administrator.

APPENDIX XIV.

CRITERIA FOR RATING FACILITIES AND DETERMINING JOURNEYMAN GRADE

For Centers handling	For Terminals handling	For Stations handling	The Journeyman Grade is:
More than 1 million aircraft annually	Radar approach control having 300,000 or more annual instrument operations*		GS-13
Less than 1 million aircraft annually	Radar approach control having between 100,000/300,000 annual instrument operations Radar approach control having 100,000 or more annual instru- ment operations, but exercising approach control authority only in the immediate vicinity of an airport as delegated by the "parent" approach control facility. or Facility having 500,000 or more total airport operations** or Non-radar or radar approach control facility meeting total airport operations' cri- teria immediately above but having less than 100,000 instru- ment operations annually, are also included in this level.		GS-12

* An instrument operation is the movement of an aircraft under Instrument Flight Rules and may be a departing arriving or over flight under the jurisdiction of a specific facility.

** An airport operation is either a landing or a takeoff at the airport at which the facility is located.

For Centers handling	For Terminals handling	For Stations handling	The Journeyman Grade is:
	Radar approach control with less than 100,000 annual instrument operations.	400,000 or more flight services annually.	GS-11
	or		
	Non-radar approach control having a minimum of 80,000 or more total annual airport operations with 20,000 instru- ment operations annually;		
	or		
	a minimum of 100,000 or more total airport operations annually; or any equivalent proportionate combination within the range of these minima.		
	or		
	A facility having between 170,000 and 500,000 total annual airport operations.		
	Instrument or airport opera- tions not meeting above criteria	100,000 but less than 400,000 flight services annually	GS-10
		Less than 100,000 services annually	GS-9

APPENDIX XV

EXTRACTS, "IMPACT OF THE MAN ON THE JOB"*

p.19 "Exceptional ability might have resulted in the attraction to the job of especially difficult work assignments; of unusual freedom from supervision; of special delegation of authority to act for the agency, etc. Unusual weakness in the ability of the incumbent might have resulted in limitations being placed on the jobs in terms of closer supervision; especially easy work assignments; less-than-normal delegations of authority, etc. A final grade-level decision must take into account the full effect of all these considerations.

p.20 ". . . . One of the earmarks of such a job is that it is one in which a change of incumbency would require a reevaluation of the job and frequently the filling of it at a lower grade. In a similar way, the job which has been restricted in content and therefore grade because of the lack of qualifications on the part of the incumbent, would require reevaluation and frequently the filling of it in a higher grade upon a change in incumbency.

"The degree of effect which a particular individual has on the job depends heavily on his own abilities. The range of abilities among people, all of whom may meet the minimum qualification requirements as we typically express them for a particular job, is very great. As our ability to identify and measure some of the less tangible aspects of human abilities is improved, it will be possible to predict more accurately the effect which an individual will have on his job, i.e., to identify more precisely the occupational areas and grade levels where he will be able to perform effectively."

p.21 "Reflection of 'Impact' in Job Descriptions"

"Recognition of the impact of a man on his job should be manifest from statements in the job description or other documentation which identify the higher level duties and give examples which clearly show the way in which the employee's performance has changed his job materially from the way in which it has been classified. This change can occur in positions of a like organizational or job content, as well as in positions which are unique to one employee. . . ."

*Introduction to Position Classification Standards (Civil Service Commission)

APPENDIX XVI

RESULTS OF A STUDY ON AIR TRAFFIC CONTROL STRESS

The purpose of the study was to evaluate the impact of ATCS work on the health of controllers by comparison of questionnaire results from ATCS personnel with those of FAA personnel not engaged in ATCS work. The study compared 569 ATCS's with 330 non-ATCS's.

Proportionately, ATCS personnel reported significantly more headaches, ulcers, chest pains, and cases of indigestion than did non-ATCS personnel. The differences between the groups did not occur until (1) after three years of service and (2) above the GS-9 grade. For ATCS personnel, reported symptoms increased significantly with years of service and with age, but was more highly related to the experience factor. Thus as ATCS's progressed through their career, they report more stress-related symptoms than do non-ATCS's. A limitation of the study is that shift workers were compared with non-shift workers.

"Self Reported Stress Related Symptoms Among Air Traffic Control Specialists (ATCS) in Non-ATCS Personnel" by Dougherty, J.D., Trites, D.K., and Dille, J.R., Aerospace Medicine, 1965, Vol, 36, 956-960

APPENDIX XVII

REVIEW OF MEDICAL INFORMATION REGARDING OCCUPATIONAL STRESS AMONG FAA AIR TRAFFIC CONTROLLERS

The subject of occupational stress and its effects on the health and productivity of people, although a matter of importance and concern in a large number of vocations, has probably received more publicity and been the object of more written and verbal discussion in connection with the air traffic controller career field, than has been the case for any other type of job-related stress during the past ten years. Many people with varying qualifications have spoken and written extensively about the weighty responsibilities, the emotional pressures, and the sustained demands for intense concentration, mental agility; rapid, accurate decision making; and clear, authoritative verbal communication, which are now widely recognized attributes of the air traffic controllers' job. Fact and fancy, reality and romance, have all been merged into a composite image, with which people who are interested in the air traffic control career field are confronted.

The controllers themselves are convinced that the demands of their job are so great that only young, healthy adults can absorb the punishment and consistently do a safe, competent job of controlling the steadily-growing volume of air traffic for which they are responsible. They refer to the inevitable deterioration of their capability as "burning out", and it is a widely accepted premise among the air traffic controller work force that the accumulated stress of performing this job is a career-limiting condition, which will cause many controllers to "burn out" by age 40 and nearly all by age 50.

One of the tasks of the Air Traffic Controller Career Committee has been to attempt to determine the true nature and extent of this occupational stress phenomenon and to assess its importance among the problems that the Committee was asked to evaluate.

This paper summarizes the medical information, culled from the vast amount of material made available to the Committee, and considered by the undersigned to be valid, factual, and relevant to the question, "Is there evidence that job-related stress has a significant effect on the psychophysiological condition of FAA air traffic controllers?" Three types of information are presented and discussed as follows:

1. Anecdotal reports of the personal experiences of individual air traffic controllers,
2. Statistical data on the incidence of medical disorders and medical retirement from the air traffic control service, and

3. Data from the first phase of a field study, initiated by the FAA Civil Aeromedical Institute in the summer of 1968, to obtain quantitative measurements of biochemical indicators of stress response from controllers under actual working conditions.

1. Anecdotal Reports from Individual Air Traffic Controllers.

At every facility the Committee visited, the controllers were in general agreement that the job is mentally taxing and that they characteristically have feelings of fatigue and being emotionally drained at the end of each shift. In each of the centers and in the busiest terminals visited, one or more controllers freely gave first-hand accounts of their personal reactions to two kinds of job-related stress--that resulting from sudden emergency events and that resulting from a personal growing sense of inadequacy to cope with the overall demands of the job. In most instances, these individual accounts were vivid, highly appropriate, verbal descriptions of characteristic symptoms of both acute and chronic anxiety reactions. Some of these stories may well have been exaggerated or even invented by controllers who sought to impress the Committee with the severity of their difficulties. The spontaneity and intensity of feeling expressed by most of the narrators, however, along with the complete absence of stereotyped or contrived descriptions of their individual feelings and physical reactions, as well as the atmosphere of sincere candor that characterized the discussions between the Committee and groups of controllers, are points in favor of the validity of these accounts. The first-hand accounts of the wide-spread occurrence of acute and chronic anxiety reactions among the controllers are, therefore, considered to constitute impressive evidence that the air traffic controller job imposes, at least on occasion, conditions which are highly stressful to the employees. The prevalence of these accounts further tends to indicate that in the high density facilities, highly stressful working conditions are more nearly the rule than the rare exception.

2. Medical Statistics.

In 1965 the Civil Service Commission approved and published an FAA-developed medical standard applicable to all controllers in terminals, centers, and certain other installations. The qualification requirements under this standard are very similar to standards for Airmen 2nd Class. Reported incidence rates of a number of diseases among the FAA air traffic controllers were accordingly compared with incidence rates of the same diseases among airmen, whose records were available at the FAA Aeronautical Center and with the incidence of these diseases in Air Force personnel generally, Air Force officers, and Air Force pilots. (All Air

Force population figures used were confined to the incidence in male personnel between the ages of 35 through 39 years.) It was found that the air traffic controller disease incidence rates per one-thousand employees, per year, for such disorders as coronary artery disease, and coronary thrombosis, hypertension and peptic ulcer, which are all generally regarded as more or less stress-related illnesses, averaged one and one-half to four times higher than the comparable rates for civilian airmen and up to eight times higher than the comparable rates for Air Force pilots. When the incidence in these populations of conditions which are not stress-related was compared, such large discrepancies were not found. For example, the incidence of hay fever and asthma was very similar among controllers, civilian airmen and Air Force personnel generally, and although the figures were lower for both Air Force officers and Air Force pilots, it is noteworthy that in these two groups, these disease entities have career-threatening implications. It is recognized that these disease incidence comparisons are not statistically valid since identical diagnostic criteria and examination techniques are not maintained. Nevertheless, the consistently higher incidence of stress-related diseases in the air traffic controllers than in other population groups who are examined annually in accordance with similar, if not identical standards, is in keeping with the expected findings, if one postulates the presence of a high degree of occupational stress among air traffic controllers.

The data concerning medical disability retirement from the FAA for calendar years 1967 through 1969 were examined with respect to air traffic control personnel and all other FAA employees. These data revealed that while the total number of air traffic controller personnel retiring for medical reasons is proportional to their numerical strength in the FAA, the incidence of medical disability retirements among air traffic controllers in the younger age brackets is far higher than in the remainder of the FAA work force of comparable age. Specifically, during this three-year period, the air traffic controllers made up about 45% of the total FAA work force and accounted for approximately 45% of all of the medical disability retirements. These air traffic controllers, however, accounted for 67% of all medical disability retirements from the FAA by employees under age 45. The incidence of disabling stress-related conditions was also disproportionately higher among air traffic controllers and especially when age at the time of disability is taken into consideration. All told, the figures on the incidence of stress-related illness among the air traffic controllers and the incidence of medical disability retirement in the controller work force, although not dramatic, are entirely compatible with the impression gained by the Committee during the interviews with controllers, that there is a significant degree of stress associated with the

air traffic control occupation. The fact that the human body has a remarkable capacity to compensate for stress before physical evidence of this stress appears in the form of disease precludes drawing conclusions regarding the relative level of stress imposed on a group of people from the statistical incidence of stress-related diseases in that group, but finding relatively high incidence of such diseases is consistent with the other data that provide evidence of a significant amount of occupational stress in the air traffic controllers environment.

3. Data from the FAA Stress Study.

A team from the FAA Civil Aeromedical Institute conducted a study of indices of stress among air traffic control personnel at the O'Hare Chicago terminal during the summer of 1969. Twenty-two air traffic controllers participated in this study, including four supervisors and five trainees, along with thirteen journeymen. A number of physiological and biochemical measurements were made during the course of this study and it is planned to repeat the same measurements at a later date, at a different FAA facility, in order to obtain comparable data to use as a basis for expressing the significance in terms of occupational stress of the various measurements. Since the second phase of this study has not yet been accomplished, the results although definitely indicative of stress, are difficult to interpret.

In an effort to present the stress hormone results from the pilot study of O'Hare ATC personnel in a manner that would fairly depict the information contained in those results, comparison was made between the stress hormone levels measured in the urine of NASA astronauts during a longitudinal stress study that was made throughout the Mercury Project with the results of the same hormone measurements made in the FAA air traffic controllers at O'Hare during the summer of 1968. Unfortunately, the hormone results from the two programs were reported in different quantitative terms, which makes it impossible to compare the absolute values or concentrations directly. Specifically, the results of the O'Hare study are reported in micrograms of hormone per 100mg creatinine as a quantitative expression of the relative concentration of the substance in the urine. The NASA results, on the other hand, are reported in terms of micrograms of hormone per unit volume of urine or per unit of time, when the time interval during which the hormone was released within the body was precisely known. Creatinine concentrations were measured in the NASA studies, but the conversion from one measurement expression to the other would require mathematical manipulation of each individual measurement for the entire Mercury program, using the raw data which are dispersed in government and university laboratories and are virtually inaccessible.

A useful comparison may be made, however, between the magnitude of change observed in the hormone excretion by Mercury astronauts throughout their training program and the magnitude of the level of hormone excretion in ATC personnel expressed as percentages of the control values obtained during that study. The results of this treatment of the data are presented in the following table.

COMPARISON OF STRESS HORMONE RELEASE IN URINE
AIR TRAFFIC CONTROLLERS VERSUS ASTRONAUTS

<u>Hormone</u>	<u>ATC Personnel</u> (% of control measurement at 7 hr. of work)		<u>Astronauts</u> (% change in daily excretion level)
	<u>Evening</u>	<u>Morning</u>	
Epinephrine	400	394	181
Norepinephrine	191	220	139
17-OHCS	76	123	605

The results of these comparisons, while meaningless in a quantitative sense, are perhaps a useful qualitative illustration of the magnitude of epinephrine and norepinephrine release in the O'Hare Air Traffic Controllers, compared with the magnitude of daily variability seen in a group of active adult males of a comparable age who were physically active and who were engaged in a highly challenging, but personally rewarding occupation. The 17 Hydroxycorticosteroid levels, on the other hand, show far less change than the range of variation measured in the astronaut population. The comparison is consistent with the statements in the body of the FAA report about the relative degree of acute stress represented by the epinephrine and norepinephrine levels in these air traffic controllers compared with other population groups and the absence of significant change in 17 Hydroxycorticosteroid levels, which are extremely difficult to interpret in view of the conditions under which these measurements were made.

These data provide clear-cut evidence of a strong biochemical response by the Air Traffic Controller personnel, who were the subjects of this study, to conditions which were perceived within their bodies as acutely stressful.

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Member, Air Traffic Controller
Career Committee

APPENDIX XVIII

FAA EFFORTS TO OBTAIN EARLY RETIREMENT FOR ATCS

1. Generally CAA/FAA has endorsed the idea of early retirement for ATCS at least since the mid-1950's.
2. FAA drafted with the Civil Service Commission an early retirement bill in 1960. Because of the emergence of a new concept (The Federal Aviation Service which was to have been a semi-military organization), the 1960 draft bill was never forwarded to the BOB for Administration clearance.
3. The Federal Aviation Service (FAS) bill provisions included early retirement. This bill was submitted to Congress and considered by Committees in 1961. It was not enacted.

Concurrent with submission of the FAS bill, FAA submitted to Congress a report of its special personnel needs. Among the needs reported was early retirement for controllers.

4. In 1964 an intra-agency committee was formed to determine if the need for early retirement for controllers continued to exist. The committee found such a need and, again working with the Civil Service Commission, drafted an early retirement bill. The bill was forwarded to BOB for Administration clearance in December 1964. BOB turned down the request as lacking proof of need and because a thorough study was to be conducted into all Federal staff retirement systems by a Cabinet-level committee (The President endorsed the committee's report and sent it to Congress. The report specifically commented against early retirement for ATCS.). That ended all FAA overt efforts to obtain legislation.
5. Interval studies have been made by FAA but no bills have been submitted to BOB since the report of the President's Cabinet Committee was published.